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***Lake Hjälmarén Pikeperch Fish-Trap Fishery
Lake Hjälmarén Pikeperch Gill-Net Fishery***

PUBLIC CERTIFICATION REPORT

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1. Executive Summary

The current assessment is of two Units of Certification – the Lake Hjalmaren pikeperch fish trap fishery and pikeperch gill-net fishery. As the science, management and operation of the two fisheries are very similar, the two are discussed together in this report, but separated where differences occur, particularly in scoring. Both fishing methods are traditional within the lake and have been practiced for several centuries.

The assessment was carried out by a team of three specialists; Dr Andrew Hough PhD. Lead auditor contracted from Hough Associates, Dr Sture Hansson, a Professor at the Department of Ecology, Environment and Plant Sciences, Stockholm University and Seran Davies, an environmental consultant and MSc assessment specialist.

Site Visit meetings were held at Lake Hjalmaren (Lennart Karlsson's fish dock/house at Lake Hjalmaren; 20 Sep 2011) and in Stockholm (21 Sep 2011) by Seran Davies and Sture Hansson. The original consultation on the assessment tree for this fishery included for use of the RBF. No objections were received to this proposal. However, the RBF was not employed on the original site visit as it was expected that appropriate information would be made available from stakeholders. Recent changes in personnel at NBF and changes in emphasis of science away from Hjalmaren have led to concomitant changes in the information base for the fishery; analysis of the information provided determined that appropriate information required to score several outcome PIs was not obtained. Accordingly, IMM carried out a further information gathering 'site visit'. This entailed a SICA workshop involving all elements of CR appendix CC. To avoid unnecessary costs to the client, and as a site visit has already taken place at Lake Hjalmaren, this additional information gathering and SICA workshop was held by teleconference on 15 November 2012.

The fishery is relatively small-scale and does not as yet have a formal stock assessment of pikeperch or other key ecosystem effects, but regular scientific and managerial monitoring is in place; scientists and managers have several good indices of pikeperch (and bycatch) stock status and good information on the operation of the fishery. Fishers have been closely involved in management of the fishery, including partaking in a scientific mark and recapture experiment to demonstrate the extent of the stock and the importance of good handling to ensure survival of fish which may then be recaptured at a larger size.

The determination of the assessment team is that the pikeperch gill-net and fish-trap fisheries should both be re-certified. Given the lack of formal assessments of the fishery, the risk-based framework (RBF) was used in the assessment. According to the rules over use of the RBF, and the scores achieved, it will not be possible to use the RBF at a future assessment. Accordingly, two Conditions of Certification have been required – the first that there must be information collected and analysed providing a direct measure of stock status (e.g. biomass) that can be compared with biologically-based reference points by the time of the re-assessment and the second that well defined harvest control rules shall be put in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached. Reference points shall be as determined under Condition 1.



2. Authorship and Peer Reviewers

Assessment Team

Dr Sture Hansson: Sture Hansson is a Professor at the Department of Ecology, Environment and Plant Sciences, Stockholm University. His research interests include both freshwater and marine fish and fisheries and he has published on topics of fish biology and ecology (including pikeperch), fishery-related impacts and other human impacts on freshwater and marine systems. He has participated in EC projects to define priority research areas in relation to the impacts of fisheries on the environment and was a member of the ICES Working Group on Ecological Effects of Fishing. He is also a member of the Royal Swedish Academy of Agriculture and Forestry.

Dr Andrew Hough: Moody Marine Limited. Dr Hough has a PhD in marine ecology from the University of Wales, Bangor on marine ecology. He has been involved in marine and coastal environmental management since 1991, including management of fishery impacts on ecosystems and marine conservation biology. He has been manager of Moody Marine operations within Moody International Certification from 1999 to 2011 with particular responsibility for the implementation of MSC Certification procedures and development of MSC methodologies. Dr. Hough has acted as lead assessor on the majority of Moody Marine MSC pre assessments and main assessments during this time. He is fully trained in use of the MSC Risk-Based Framework.

Seran Davies

Seran has considerable experience of subtidal benthic and intertidal ecology, fisheries and other ecological survey and assessment techniques. For the past ten years she has been heavily involved in environmental monitoring programmes for marine and coastal ecology. Seran has led the fishery assessments for the successfully certified Norwegian Cod and Haddock, Antarctic krill, Norwegian Herring, Swedish Herring and Danish mussel fisheries. She is also the SEAFISH 'Responsible Fishing Scheme' – UK North West and Wales Auditor- responsible for assessing the UK fishing fleet against scheme requirements and was an invited participant in the 'Low trophic fisheries consultation' workshop in Washington DC (2009).

Peer Reviewers:

Dr Andrew Gill. Andrew Gill is an academic member of staff at Cranfield University, UK, and has over 15 years' experience as an aquatic ecologist with a particular interest in the fish and fisheries ecology and links with human activity. His currently projects include: feeding ecology of freshwater fish; the effects of global climate change on freshwater fish reproduction and the subsequent consequences for fisheries management; river restoration for fisheries. Much of his work has been with government agencies and environmental management bodies on projects concerned with human impact on ecosystems.

Dr Jim Andrews. Jim is a marine biologist with over 20 years' experience working in marine fisheries and environmental management. He currently works as an independent fisheries and marine environmental consultant. His previous experience includes running the North Western and North Wales Sea Fisheries Committee as its Chief Executive from 2001 to 2005, and previously working as the SFC's Marine Environment Liaison Officer. He has an extensive practical knowledge of both fisheries and environmental management and enforcement under UK and EC legislation. He has worked as an assessor and lead assessor on more than 20 MSC assessments within the UK, in Europe and in India since 2007, including several in Scandinavia.



3. Description of the Fishery

3.1 Unit(s) of Certification and scope of certification sought

The Unit of Certification is defined as:

| | |
|---------------------------|---|
| Species: | Pikeperch/Zander, <i>Sander lucioperca</i> |
| Geographical Area: | Lake Hjälmaren, Sweden |
| Method of Capture: | Summer fish-trap fishery Winter gill net fishery (two Units of Certification) |
| Stock: | Lake Hjälmaren is effectively discrete from other lakes in terms of fish stocks. |
| Management System: | The collection of catch statistics, and stock monitoring is carried out by the Swedish University of Agricultural Sciences (SUA, having taken over from the now disbanded National Board of Fisheries). The setting of regulations and licence control and provision, surveillance and fisheries control is provided principally by the County Administrative Boards (three counties border lake Hjälmaren; Örebro, Västmanland and Södermanland but organised by the county of Örebro for the whole lake), which may also vary fishing regulations in specific conditions. |
| Client Group: | All licensed pikeperch fishermen on Lake Hjälmaren are considered as eligible fishers |

All of the pike perch fishermen on Lake Hjälmaren are within this fishery and belong to the Lake's fisherman's organization.

There are no introduced species or stock enhancement activities in relation to this fishery. The fishery is considered as being within scope of the MSC fishery standard.

3.2 Overview of the fishery

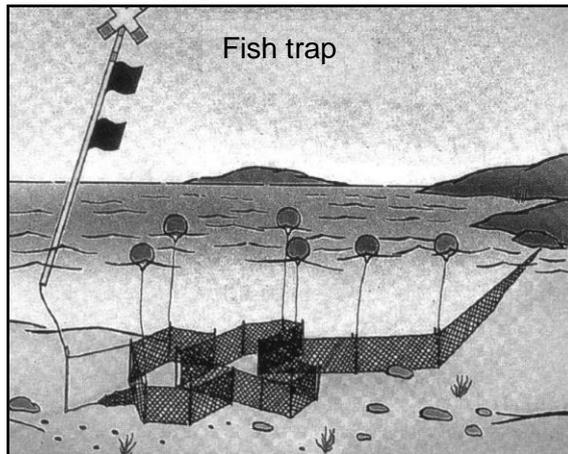
There are now 26 licensed and active fishermen on the lake (this is reduced from the 35 in the original assessment in 2006); the average age of the fishermen is relatively high and fishermen have since retired. Fish traps are used mainly during the ice free season while gill nets are used mainly under the ice, although these can be used throughout the year. Catches from the two gears combined are approximately 150-200 tonnes per year which includes pikeperch, pike and perch. The gill net fishing intensity has dropped significantly in recent times attributed to the difficulty of the ice fishery, whilst the trap net fishery has been at a reasonably constant level.

3.2.1 Fishing Gear

The fish traps used in Lake Hjälmaren are not standardised, but vary in size, construction and mesh size. A common rule is, however, that the fish house (the part of gear where the fish are trapped and that is taken up to the surface and emptied by the fishermen, as a cod-end) must be at a depth less than 5 m. This is to avoid excessive swim bladder expansion, which would otherwise cause buoyancy problems in discarded fish and lead to increased mortality, e.g. through predation by gulls. With the regulated shallow depth of the fish house, and swift catch sorting procedures, observable mortalities of discarded fish is very low (observations by the MSC evaluation team and by scientists from SUA). As an illustration of low mortality of discarded fish it can be mentioned that tagged undersized pikeperch have been recaptured repeatedly (>10 times, one individual 39 times, Nyberg et al. 1996) in these traps.

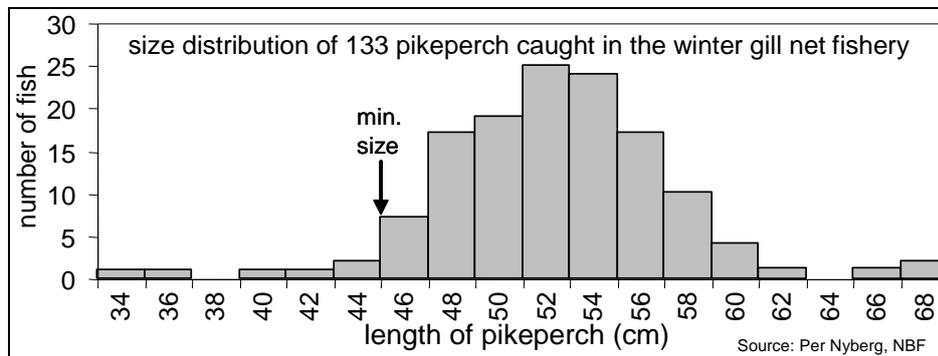
Catches of undersized pikeperch (<45 cm) varies depending on the mesh size in the trap. Recordings of small individuals (20-30 cm) in some fine meshed traps are used by SUA to assess the strength of coming year-classes.

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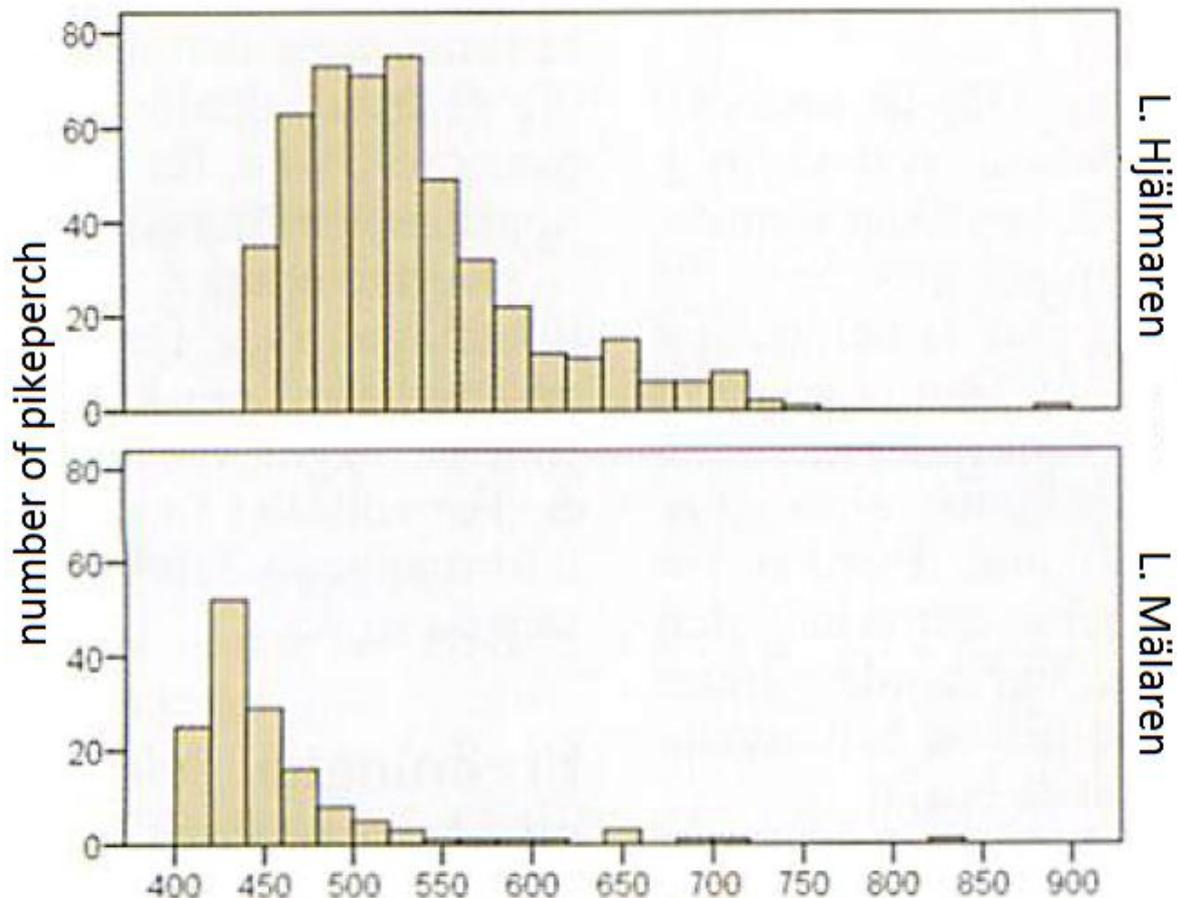


The gill nets used in Lake Hjälmaren are standardised with regard to mesh size (60 mm bar, 120 mm stretched mesh). With these nets, catches of undersized (<45 cm) pikeperch is small (see below). Other fish species caught in these nets are pike (*Esox lucius*), occasional large perch (*Perca fluviatilis*) and bream (*Abramis brama*). Perch and pike are landed and sold for human consumption, while the bream are used as bait in crayfish traps (these fish are considered as a retained species).

With the current mesh regulation, the discard of undersized pikeperch in the gill net fishery, is very small (graph below). The survivorship of discarded pikeperch is referenced above and it is assumed that this will apply equally to smaller sizes.



The gill net regulation in L. Hjälmaren has resulted in a pikeperch size distribution with much larger fish than in the nearby L. Mälaren where the minimum landing length is 40 cm (Degerman et al. 2008, graph below).



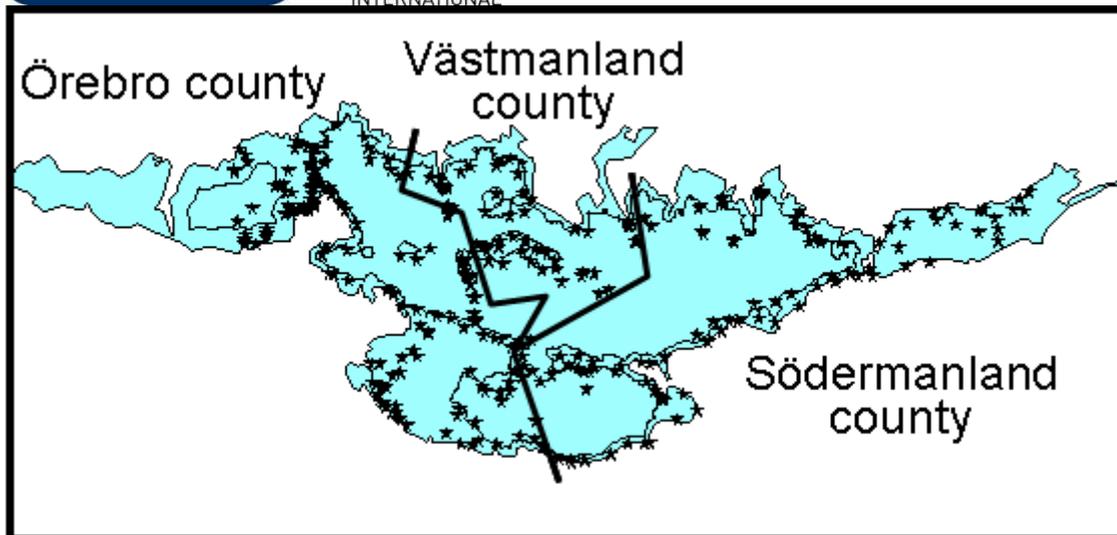
Catches in trap nets, May 2008. Undersized fish not included

3.2.2 Input / Output Constraints

The fishery is managed through input control. The fishing intensity is regulated by the number of permits licensed. Such permissions are required for all commercial fisheries on public waters (the vast majority of the fishery). Permissions are granted for three year periods, and can be reduced if required, e.g. if there are decreases in the stock size. There is no total allowable catch system or other output constrain, but there are rules on the design of the fishing gears (depth for traps and mesh size for gill nets) and size limits for landed fish. Otherwise, there are no formalized management reference points or action plans in case of population reductions.

3.2.3 Fishing Location and Administrative Boundaries

Lake Hjälmaren belongs to three different counties and the management of the fishery is closely coordinated between these (Nilsson et al. 2010). The map below shows county borders and possible locations for licensed trap nets (around the shore and islands, although not all of these are used). Fishing sites for the gill net fishery are not locked to fixed locations, but take place mainly on shallow areas that are located reasonably far from the shores.



3.2.4 Other fisheries relevant to this assessment

As well as the commercial fisheries, angling and 'household/recreational' fishing also take place (household fishing including limited traps, gill nets and crayfish pots). The quantities taken in these fisheries are, however, small compared to commercial landings (MSC evaluation team's discussions with fisheries officials) and as long as the pikeperch population density is high, the competition among different categories of fishers is minimal.

There are also commercial and recreational fisheries for crayfish. Since the trap nets are relatively few given the size of the lake, and as they are static gears, there is little or no competition for space. The pikeperch fishery supplies much of the bait (bream) for the crayfish fishery.

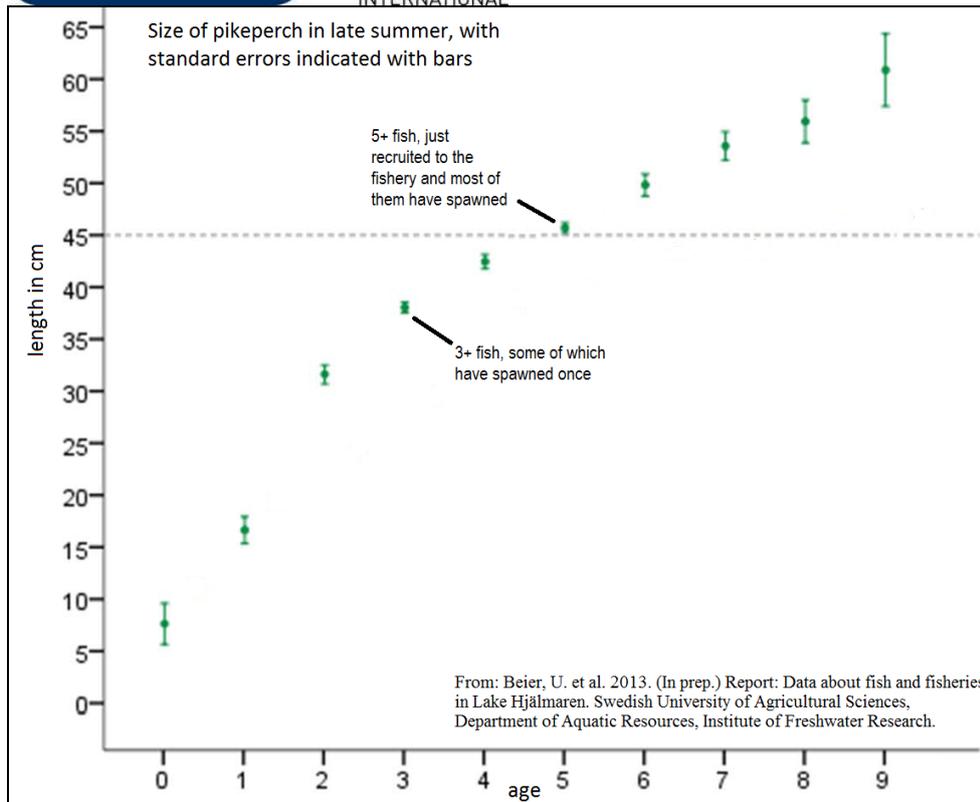
3.3 Principle One: Target Species Background

3.3.1 Biology of the target species

Pikeperch (*Sander lucioperca*) is a piscivorous freshwater percid that occurs in eastern and central Europe. It is pelagic and found through lakes and in the Baltic (primarily in the littoral zone), with smaller individuals in shallower water. It can grow reasonably old (>20 yrs) and reach a mass of over 10 kg. The overall life history pattern of pikeperch is well established.

Spawning takes place at shallow water (often 2-5 m) in the spring/early summer. The spawning site is aggressively guarded by the adults until the eggs have hatched. Spawning takes place onto substrate at around 2-5m depth, typically clay/sand substrate with some vegetation. Within Lake Hjälmaren, the main spawning areas are well known (particularly Mellanfjärden). Closed areas are established to protect such key spawning/nursery areas (Mellanfjärden is closed 1 May – 31 Aug.). Pikeperch are expected to spawn around the lake in suitable habitats, but other spawning areas with suitable habitat are known in less detail.

With the present size limitations in the fishery, and their growth in this lake, they are expected to spawn at least once before subjected to the fishery (sexual maturation at age 3-5).



An external factor of importance for the recruitment of pikeperch is climate. Warm summers are associated with strong year classes and this has been documented for many years, both recently and during the mid 20th century. The correlation coefficient between year class strength and summer temperature (June-July) for the years 1953-67 was 0.75 ($p < 0.01$, P. Nyberg, scientist retired from the Swedish Bd. of Fisheries, pers. comm.).

Another factor that may influence recruitment, growth and production of pikeperch is the overall trophic status of the lake. Anthropogenic eutrophication is assumed to have favoured the development of a strong pikeperch population in Lake Hjälmaren (over hundreds of years). Actions are now taken to reduce the loads of nutrients to Swedish lakes and this may, in the long term, reduce pikeperch production in Lake Hjälmaren. Such changes are, however, likely to be slow processes (decadal timescale) and hence possible to accommodate in fishery management.

There are no major studies on the diet of pikeperch in Lake Hjälmaren, but many studies have been conducted throughout Europe. The larval fish feed on zooplankton, but these prey are soon replaced by larger animals such as mysids and small fish. Adults feed almost entirely on fish. Small individuals are predated upon by perch, pike and also conspecifics. Tagging experiments in this lake show that individuals can move more or less over the entire lake and there is nothing to indicate the presence of sub-populations. In the tagging study, 2299 pikeperch in the size range 203-399 mm were tagged and 887 of these were recaptured at least once. Of these individuals 28 fish were caught at least 10 times and one individual was caught 39 times. These catches were taken in trap nets which can be fine meshed since they are also targeting other fish species. The recapture rates indicate the high intensity of the fishery, but also show the high survival of discarded, undersized fish. The National Fisheries Board (NFB) has also produced information material, including a video, for the fishermen on how to minimize mortality in discarded fish.

Seasonal migrations take place within the lake between shallower areas (including spawning areas) in the summer and deeper water in the winter. The pikeperch stock is contained within the lake with no evidence of significant migrations into neighbouring water bodies.

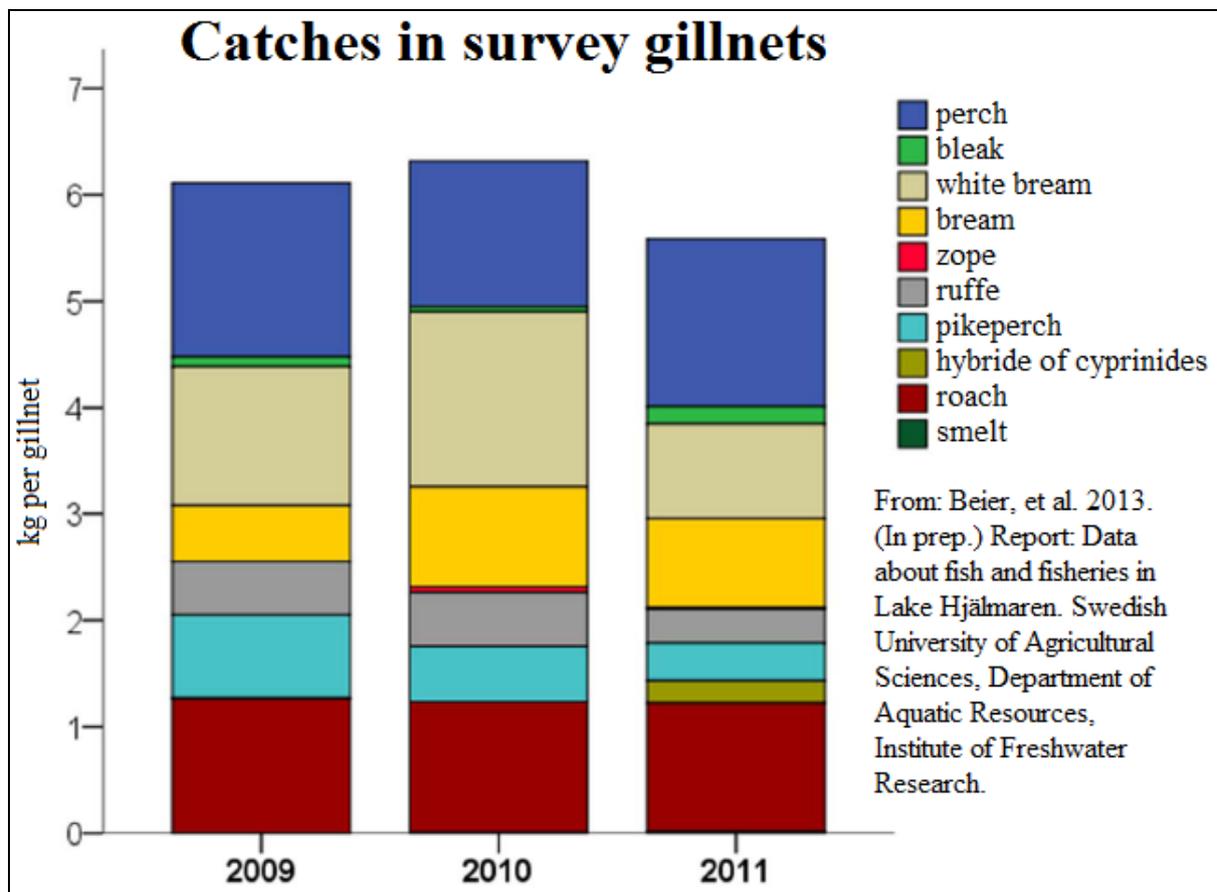
3.3.2 History of the fishery

In the early part of the 20th century, the commercial fishery in Lake Hjälmaren targeted crayfish with a 'subsistence' fishery of fin-fish species, principally pikeperch. The loss of the native crayfish through crayfish plague resulted in an increased fishery for pikeperch. Catches were high in the middle of the Century, but by the end of the Century there was a drastic decrease. Some drastic management measures were then taken, including an increase in the minimum legal size of pikeperch to 45 cm and a minimum gill net mesh size of 60 mm knot-to-knot. Over recent years, and combined with some warm summers with good recruitment, this has resulted in a fast increase in the stock and in catches (and with no increased in effort, see below). These new rules are based on the Fisheries Act of 1994, which required commercial fishermen on public waters to be licensed by the NFB. Details in the regulations are developed in discussions with the fishers.

3.3.3 Stock Status and Reference Points

There is an ongoing analysis of stock status relative to historical data (informal reference points) which allows forecasts to be made on the health of the stock and management actions to be taken. Stock status is assessed through a test fishing programme which take place (August) across the lake and will do so for the foreseeable future. These record the lake's fish population structure, number and distribution using multi mesh gill nets (results below). Hydroacoustic surveys, combined with trawl fishing, have also been done across the lake. Length-frequency data, species statistics and otoliths are collected for analysis and the findings are presented in annual reports (Beier, 2013). Supporting information on stocks status and dynamics also comes from comparisons with information from the neighbouring Lake Malaren (e.g. Fig. 3 and 8).

Figure 6



Stock status of the Lake Hjälmaren pikeperch and other targeted fish species is currently considered to be good based on the long-term development in catches (Fig. 7). None of the species show decreased catch trends, with the possible exception of the stocked eel. In recent years, commercial catch rates in both gill nets and trap nets have been generally high and better than in the nearby located L. Mälaren (Fig. 8)

Figure 7

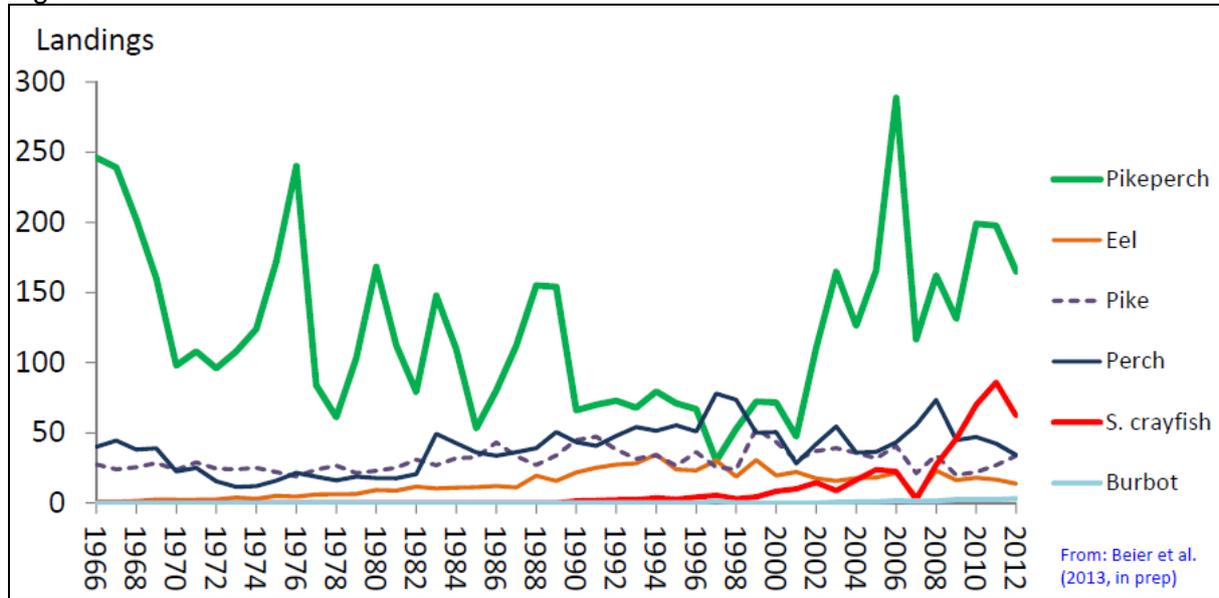
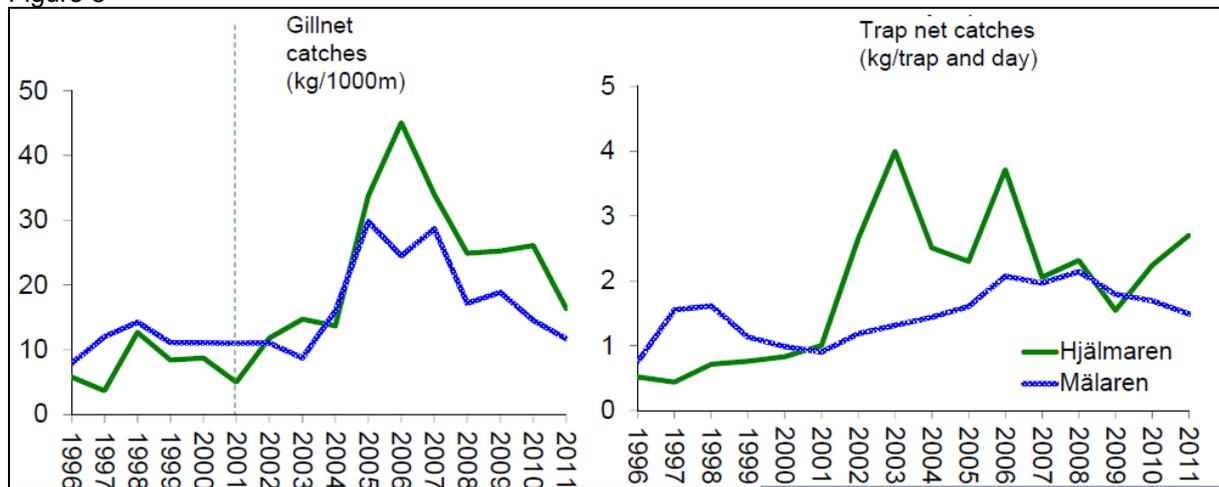
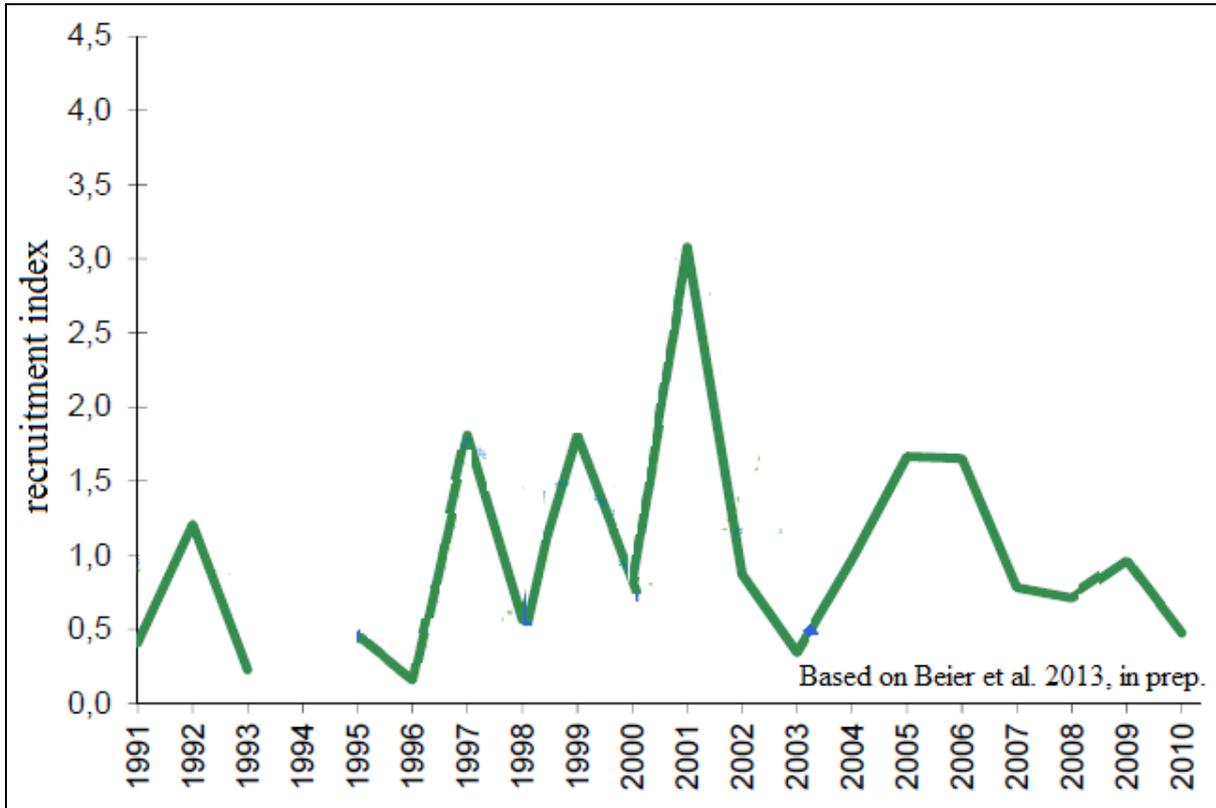


Figure 8



The recruitment of pikeperch in L. Hjälmaren expressed as catches of age 2+ fish in selected commercial trap nets, which predicts changes in fishable stock 2-3 years ahead, do not indicate problems in foreseeable time (graph below). This is particularly true as catches are made up by several year classes (c.f. Figs. 3 and 5).

Figure 9

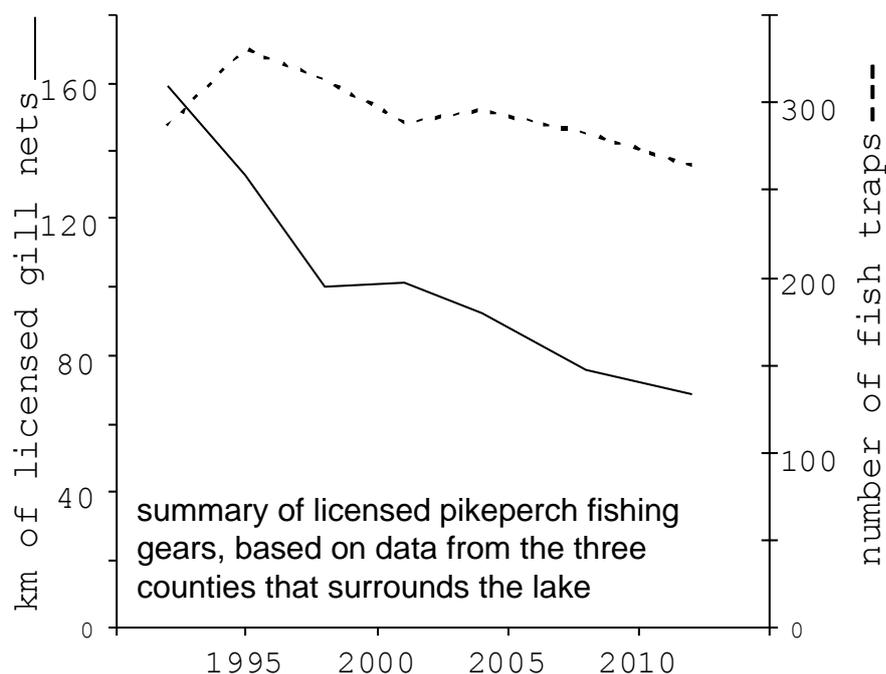


However, formal reference points, linked to the indices of stock status described above, have not been established. Accordingly, in the assessment below, the MSC risk-based assessment framework (RBF) has been used to evaluate the status of the stock.

3.3.4 Harvest Strategy

The overriding objective is to maintain a sustainable commercial fishery in the lake (Nilsson et al. 2010). There are no quotas applied, but the rate of exploitation within the fishery is controlled by input controls. These are evaluated against trends in a number of separate indices of the stock (CPUE and pre-recruit year-class strength (Fig. 8 and 9 respectively)) to ensure the fishery operates at a low risk of overfishing. Licences given for gill net fishing have been substantially reduced over time, and to some extent also the numbers of licensed fish traps (graph below, not all licensed gears are actually used).

Figure 10



3.3.5 Harvest Control Rules and Tools

Management measures (with accompanying decision rules) in the event of population decreases are well known and can be applied via County Boards. Mechanisms to reduce harvest are:

1. removal of licences for fishers
2. complete closure of fishery on public waters
3. non-issuance of new licences to fish
4. reduction in effort (reduction in amount of gear allowed, notably reductions in lengths of gill-nets allowed and change in minimum size)

Control of licensing and fishing activities is managed by the county boards via close surveillance of activities on lake. Only input controls applied. As gear-use permits are reviewed regularly, it is possible for the counties to restrict effort within the fishery. It is also possible, as licenses are reviewed on a regular basis, to restrict the number of licences available. These measures are kept under constant review by NBF and County managers.

Although these measures are not reconciled with formalised reference points, the status of the stock and fishery are sufficiently well monitored to allow for implementation of management measures if there is a perceived risk of overfishing. Ongoing monitoring is in place to measure the effectiveness of actions taken. However, the means and sequencing by which controls would be applied if necessary, is not clearly specified. This relates to lack of formal reference points and decision rules.

Mesh sizes in trap nets vary since they are not only targeting pikeperch. However, this is not expected to significantly influence the size selective mortality, as undersized pikeperch are returned alive and show excellent survivor (Nyberg et al. 1996). Location and time of fishing are not significant in affecting selectivity.

3.3.6 Information and Monitoring

Fishery dependent indices are available on the abundance (CPUE, Fig. 8) and composition (size /age composition) of the stock (Fig. 11). These also include assessments of pre recruit-into-fishery fish (using information collected by fishers, Fig. 9) and size compositions in the scientific test fishing (Fig. 12). The other key factor affecting recruitment strength (temperature) is known, effects are

understood (Nyberg 2001), and this is also used to predict major changes in future fishing possibilities.

Figure 11

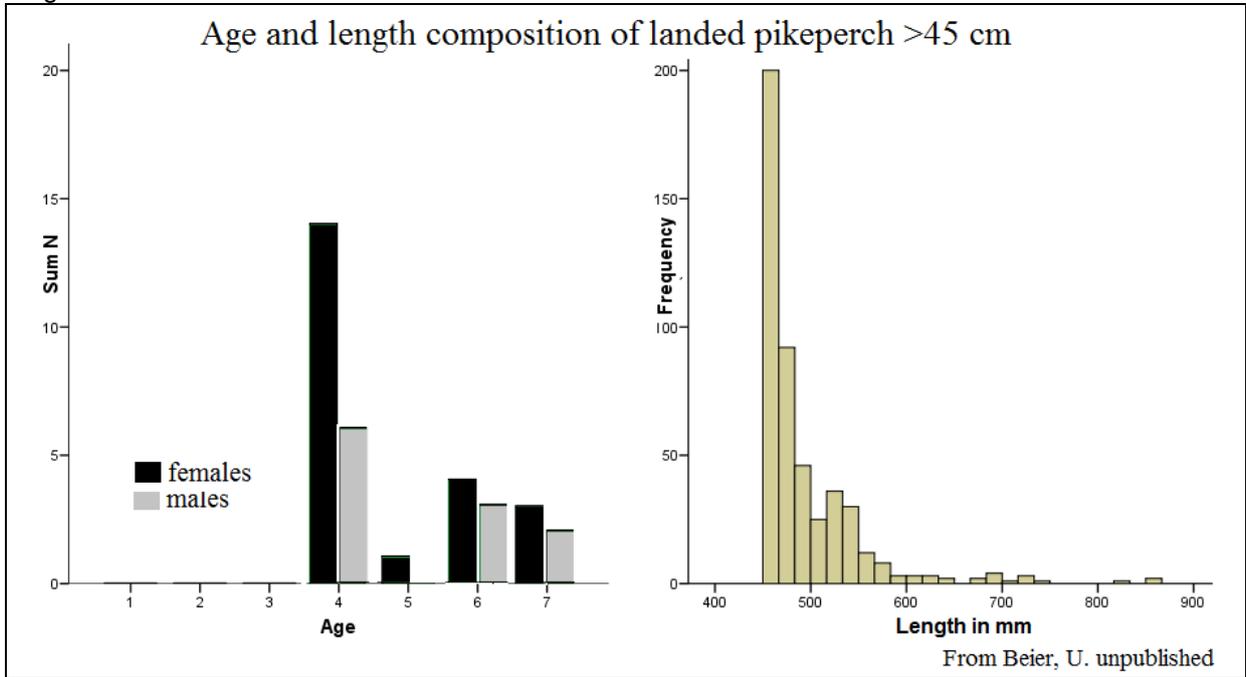
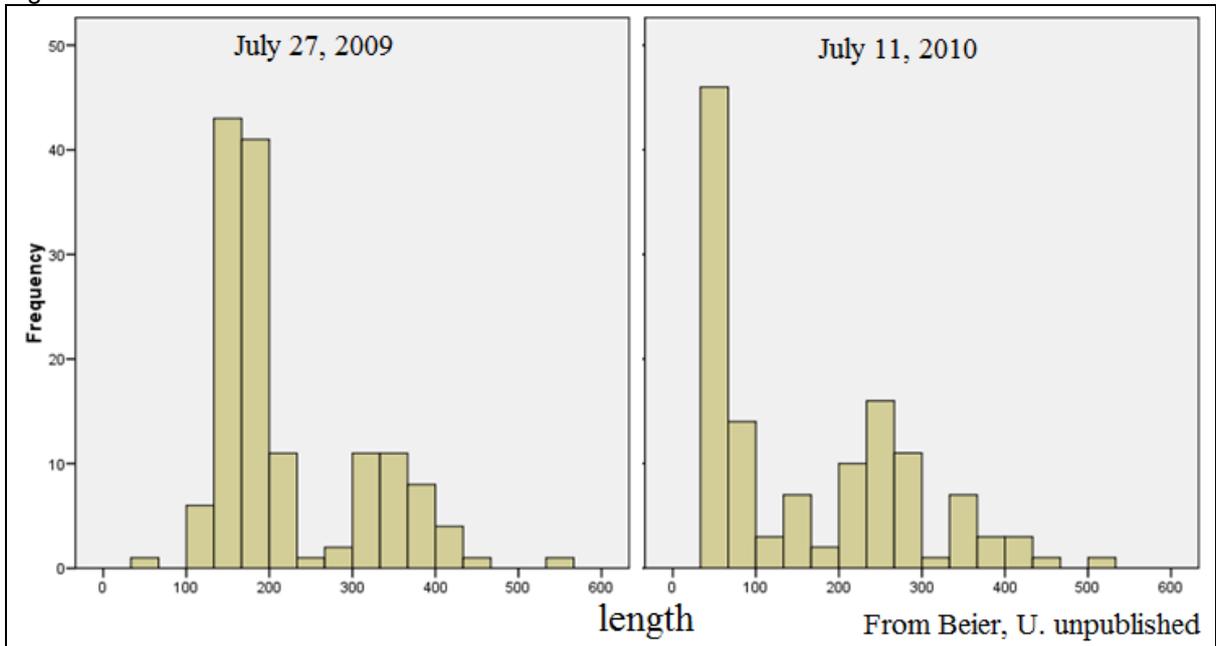


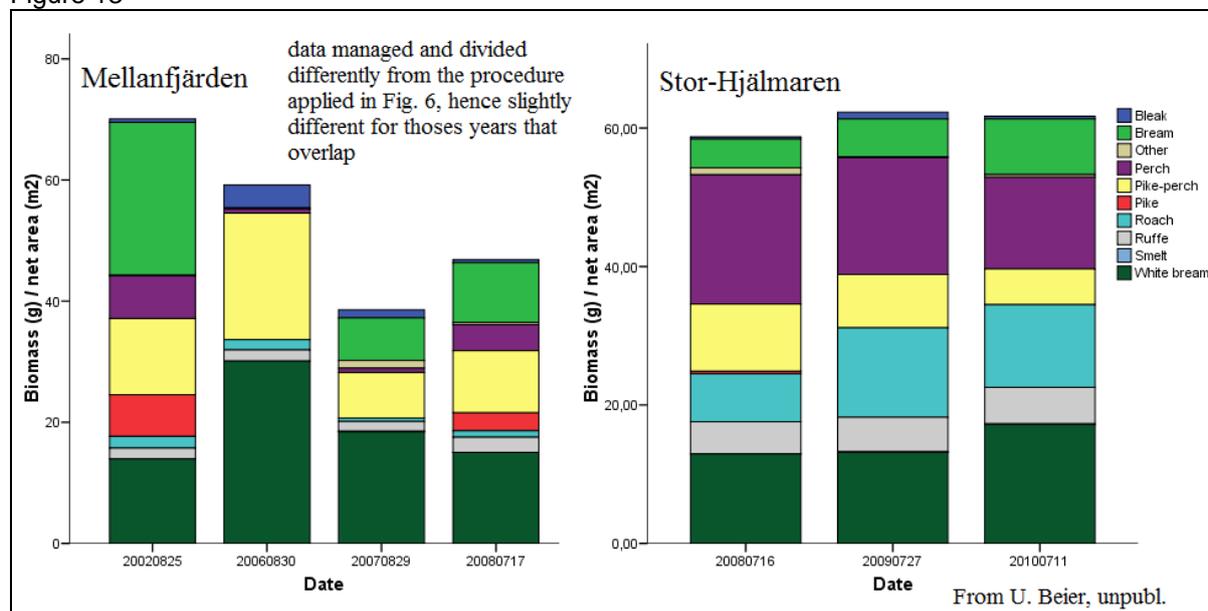
Figure 12



A test fishing program following a standard protocol multi mesh gill-nets (Appelberg et al. 1995 and Appelberg 2000) is conducted in August (Figs. 6 and 13). Two different areas are fished: Mellanfjärden (considered to be the most important nursery area for pikeperch in the lake) and Stor-Hjälmarén. This test fishing yields data not only on pikeperch, but the whole fish community. It also provides additional data concerning the recruitment of pikeperch (Fig. 12). The gill-net catch provides a measure of the recruitment of pikeperch at least one year before the same year class will be caught in the fish-traps. Otoliths for ageing are also sampled from the pikeperch and good information on the bycatch species is provided. The test fishing programme produce length-frequency distribution charts

for the different species and hence records the lake's fish populations structure, number and distribution

Figure 13



Pre-recruit and CPUE indicate a healthy pikeperch population and data show variation but now long-term negative trends (Figs. 8-9). One key environmental factor is temperature (Nyberg 2001), particularly in the late summer/autumn, which allows young of the year fish to shift to fish-prey before winter. This has known effects on year-class strength. Smelt availability (key prey for young fish) is also suspected to affect year-class strength. Predators are known. This environmental information, together with the pre-recruit surveys are considered in the management when evaluating the possible future stock status.

There is accurate landing data of commercial catches (Fig. 7) and size distribution data from commercial landings (e.g. Fig. 11, undersized fish are all returned alive). This information is all collated and verified by SUA scientists. County boards give permits for all trap nets and all locations are mapped; licensed fishermen are well known to regulators. Fishing sites are regularly inspected, as are recreational fishers. Gear use and fishing practices are well known and guidance is provided by managers on means of improving catch handling etc. Recreational catches are not recorded, but information and monitoring of fishing activity within the lake is sufficient to determine that this is not significant. The nature and extent of discards are well estimated by SUA and County Board managers.

A tagging experiment on pikeperch has shown discard/incidental mortality to be very low (i.e. very good survivorship if released, including juveniles, Nyberg 1996), also that the majority of fish caught were by commercial fishermen which are included in statistics. If anglers or non-commercial fishers had caught tagged fish, they would frequently have reported that, since almost all fishermen are seriously interested in fish and they had not been doing anything illegal when catching these fish.

The age structure of the population is suitably well established, monitored and verified annually through analysis of catches in fish traps. Sex structure is not monitored; it is justifiably assumed that females, growing faster than males, are caught more efficiently, but the increased minimum size means that all individuals will have the opportunity to reproduce prior to removal (Fig. 5).

There is no indication of sub-populations, or conditions which would favour sub-populations, within the lake and so it is considered that there is a single population present. This appears reasonable from a management perspective. The tagging experiment showed that individual fish can appear in all regions of the lake.

3.3.7 Assessment of Stock Status

Information on stock structure shows a consistency/increase in the number of year classes and in the overall stock status. There is no indication or suspicion that catches would be predominantly one sex to an extent that would influence reproductive capacity. Overall, there is no indication of recruitment overfishing; the reproductive capacity is expected to be at a sustainable level.

3.4 Principle Two: Ecosystem Background

3.4.1 Background to Ecosystem within which Fishery Operates

Lake Hjälmaren is a 480 km², shallow (mean and max depth 6 and 20 m respectively), eutrophic lake (50 µm/L tot-P), with an annual fish production of ~4 kg/ha. Pikeperch is the most abundant piscivorous fish, but perch, *Perca fluviatilis* and pike *Esox lucius* are also common. Cyprinids are common and assumed to be important prey for pikeperch. Other important species to the fishery are eel, *Anguilla anguilla* (stocked with elvers from River Severn, UK, but this stocking has now been stopped) and crayfish, *Pacifastacus leniusculus*. The native crayfish (*Astacus astacus*) was exterminated by the crayfish plague (*Aphanomyces astaci*) in the beginning of the previous century, but the stocked North American crayfish has now established a strong and commercially exploited population in the lake (Fig. 7).

Sweden has almost 100 000 lakes larger than 1 ha and limnology/freshwater ecology has a long tradition. The general understanding of lake ecosystems is thus good and there is no indication that Lake Hjälmaren should be peculiar in some way. It is thus possible to make an evaluation of the role of pikeperch in the food web and the ecological effects of the fishery even in the absence of studies on the trophic couplings in this particular lake.

3.4.2 Retained Species (retained by-catch or by-product)

Commercially significant catches of perch and pike are also taken and there are no indications in catches that these populations are decreasing (Fig. 7). Large quantities (around 200 tons) of bream (*Abramis brama*) are caught, most of which is landed for use as bait in crayfish traps. A small proportion of bream catches are fed to raptors (sea eagles and ospreys) from the gill net fishery when the lake is frozen. Burbot is occasionally caught and retained – primarily in gill-nets.. There are no indications that any of the other by-catch species taken in the trap-net fishery are fished at unsustainable levels, but the risk-based framework (RBF) was used to confirm this.

There is good quantitative information on landings and CPUE of commercial by-catch species from the fisherman's log books (compiled and statistically analysed in Gothenburg office before being sent to SUA). A standardised (Appelberg et al. 1995, Appelberg 2000) test fishing program with multi mesh gill nets is in place. This survey covers also Mellanfjärden, which is considered to be the most important nursery area for pikeperch in the lake. This test fishing provides information on the status of the whole fish community (Figs, 6 and 13).

3.4.3 By-catch Species (discarded bycatch)

Undersized pikeperch and other fish that are discarded have a very high survival (Nyberg et al. 1996, personal observations by the MSC evaluation team). This is because of a combination of a swift catch sorting procedure and a rule that says that the trap nets fish house must be at depth less than 5 m.

By-catch species are all known and the most common are small perch and pike, bream, white bream and roach. The distribution and ecology of by-catch species is well established either specifically within Lake Hjälmaren or from general information for the species in terms of ecology. Information on the population status of by-catch species is available from the test fishing programme (Figs, 6 and 13).

3.4.4 Endangered, Threatened and Protected Species (ETP)



Fish. Among the Swedish Red Listed fish species (although these are not formally classified as ETP), only one besides eel occurs in the lake and that is asp (*Aspius aspius*, classified as vulnerable). This species is occasionally caught in traps but released alive. Eel is an introduced species in the lake now and its population has been maintained by stocking of elvers, an activity that now has been stopped

Birds. Sea eagles (*Haliaeetus albicilla*) and ospreys (*Pandion haliaetus*) are present on the lake and are occasionally fed unwanted fish by the fishermen (mainly in winter from the gill-net fishery when the lake is frozen). There are no direct interactions of raptors with the fishery.

During seasonal migrations, when present on lake in relatively high numbers, cormorants may be caught in fish trap fishery. Numbers of piscivorous birds affected by the fishery were recorded following the first MSC assessment of the fishery. Very low number of birds (<5 per annum) were caught in the traps and they were all cormorants (as detailed in previous certification and surveillance reports). This should be compared to the annual cull of approximately 2000 birds as the population is assessed by the government as being too large. The fisheries under evaluations thus constitute no threat to the bird populations and no mitigations are required. Bird populations are monitored by the ornithological society and data are collated by the Swedish Natural History Museum.

Other Species. Otters are not present. Beavers are, but not in locations where they may interact with the fishery.

3.4.5 Habitats

The overall bathymetry of the lake is well known and this information is used to determine likely spawning areas etc. Fishermen are aware of local bathymetry. Some spawning areas are seasonally closed to fisheries.

Traps are placed in areas of sand and muddy sand with steeply sloping lake bed; stony areas and macrophytes are avoided as these damage the net and allow fish to escape the net. Gill-nets are entirely pelagic and are deployed at low levels – thereby not affecting the bottom of the lake.

The location of fishing operations is very well known and traps are moved little if at all between years. All locations are known on an annual basis and fish trap locations are mapped and subject to inspection.

The sensitivity of habitats to fishing operations is reasonably considered to be very low – these are static gear with limited benthic impact. Gear use is known in terms of timing and locations. Sensitive habitats (macrophyte beds) are deliberately avoided by fishers. Habitat effects are reasonably assumed to be negligible. However, no specific studies have been carried out and so the RBF is used to evaluate outcome status of habitats.

In the westernmost part of the lake, there is a small ‘Natura 2000’ area. This is a very shallow area where none of the currently evaluated fishing activities takes place and there are consequently no conflicts in this respect.

3.4.6 General Ecosystem Effects

The trophic position of pikeperch is well known in general terms, including for different life stages. Although few specific studies have been carried out in Lake Hjälmaren, potential prey and predators are known, with some relatively anecdotal information from Hjälmaren; there is no reason to suppose that this general information is not applicable.

The water management organisation of the lake monitors the water quality, phytoplankton, zooplankton and benthic invertebrates. Water quality data, in particular nitrogen and phosphorus, are important as indicators of lake productivity. The test fishing programme using fish traps and gill nets monitors populations of the main fish species present; During August two persons accompany four fishermen distributed over the lake and record all species of fish caught, count all specimens and measure the length of all fish caught in the fish-traps. As these fish-traps have fairly small mesh size, a number of other fish species will be caught. This will, in the long run, give results concerning the



status of the populations of most species in the lake. Results of such monitoring are made publicly available and are collated and integrated with other work relating to the fishery. All data are regularly evaluated by the fishery management team and it is possible to impose restrictions should evidence indicate that a modification of fishing pressure is required. Results from test fishing and the sampling of commercial catches are summarised in the figures presented earlier in this report.

The nature and management of the fishery is such that only a small proportion of by-catch species is taken. Larger proportions of pikeperch are taken, but productivity is maintained (including through a large minimum size). No gear loss is possible, fish traps are large and nets are very well anchored to permanent moorings. Fish trap locations are all mapped and liable to inspection by County managers. This information suggests no significant changes in ecosystem structure and function due to the removal of non-target species.

The new national management authority (The Swedish Agency for Marine and Water Management, SwAM) wish to continue with an ecosystem based approach to fishery management (U.Beier, SUA, pers comm, 2011). Environmental monitoring continues to be undertaken on the lake in keeping with the requirements of the Water Framework Directive.

3.5 Principle Three: Management System Background

3.5.1 Management Background and Legal Framework

The previous national management authority, the Swedish Board of Fisheries, has been disbanded and a new new management authority (The Swedish Agency for Marine and Water Management, SwAM) has been formed. The scientists working with fisheries issues are now part of the Swedish University of Agriculture- Dept. of Aquatic resources (SUA). However, no changes to the actual management system have taken place that would detrimentally affect the performance of this fishery against the MSC standard.

The SUA is responsible for science and management advice and SwAM and the County boards are responsible for licences, enforcement, control and making extension to national regulations in specific cases. The three county boards relevant to Hjälmaren have established a functioning cooperation with the lead county being the Örebro County (Martin Engström). There is close cooperation between the personnel at SUA and the County boards.

General environmental monitoring is conducted by Hjälmarens Vattenvårdsförbund. The system is entirely consistent with the context scale and intensity of the fishery, as evidenced by the cooperative relationship between the management bodies and fishermen's, organisations and local authorities).

The fishery is operated entirely under domestic law and, being a freshwater fishery, is exempted from the Common Fisheries policy. Conventions regarding nature conservation, notably the Habitats and Birds Directives are complied with under Swedish Law. Disputes within the fishery are discussed and resolved under the Swedish management system, initially through the county boards. Ultimately, complainants can take legal action, up to the European court of justice.

A codified system exists by which prospective applicable fishers apply for a licence, which is granted under consideration of the status of the target populations. No one is dependent on fishing for food; all fishing is commercial or recreational. One of the bases of the Management plan (Nilsson et al. 2010) has been to establish a basis for licence allocation which provides a sustainable livelihood for those fishers with the clearest dependency on the fishery, while maintaining the stock and ecosystem status of the Lake within which the fishery operates. A general aim have been to reduce the total quantity of licensed fishing gears (Fig. 10), to address the risk of substantially increased fishing pressure, and overexploitation, in the case of a reduce recruitment to the pikeperch population.

3.5.2 Consultation, Roles and Responsibilities



Representatives from the SUA and the three counties surrounding the lake have regular discussions with the fishermen's organisation and also with individual fishermen (some are not members of the fishermen's organisation). Proposals put forward by the management bodies are explicitly discussed with fishermen's representatives. Requests to county boards to issue licences must be approved by SUA.

There is also contact with other stakeholder groups (e.g. anglers and environmental organisations), but not to the same extent as with the fishermen; proposals for changes in fishery management are advertised locally for consideration by affected stakeholders. Representations made by affected stakeholders are given due consideration.

3.5.3 Long-Term Management Objectives

The overall management objective is to promote a sustainable commercial fishery in the lake (Nilsson et al. 2010). There are no quotas applied, but the rate of exploitation within the fishery is controlled by input controls (Fig. 10). These are evaluated against trends in a number of separate indices of the stock (CPUE Fig. 8, stock size composition Figs. 11 and 12, and pre-recruit year-class strength Fig. 9) to ensure the fishery operates at a low risk of overfishing.

3.5.4 Incentives for Sustainable Fishing

The pikeperch fishery went through a very bad period in the late 1990's, before the minimum landing size was increased to 45cm and gill nets modified accordingly. After these new rules were taken, the situation has very much improved. The tagging experiment of undersized pikeperch (Nyberg et al. 1996), that was done in cooperation with the fishermen, showed that undersized pikeperch have good chances of surviving if handled appropriately. The fishermen are very well aware of these facts and that they are gaining from the current management regime. The allocation of fishing licenses (entry to the fishery) is transparent and undertaken in an informed manner consistent with the promotion of a sustainable fishery. There are no subsidies or other mechanisms that would compromise the sustainability of the fishery.

3.5.5 Fishery-Specific Objectives

The long-term objective to maintain a sustainable commercial fishery in the lake is operationalised through a number of fishery control rules and tools as detailed in Section 3.3.5. Procedures exist to measure fishery parameters in relation to appropriate specific objectives, particularly catch size distributions, recruitment and CPUE of commercial species. These are monitored on an ongoing basis and considered in relation to objectives for each.

In particular, trophic effects are mitigated by an increased minimum size, allowing for a greater stock of larger pikeperch (a top predator in the system); the level of impact of the fishery is considered to be extremely low. Also, a closed area has been established (following a review of relevant scientific information) in a major spawning/nursery area in lake (Mellanfjarden) and this is enforced by County Board inspections.

3.5.6 Decision-Making Processes

Procedures to limit harvest are established (Nilsson et al. 2010). Specifically all licence applications are reviewed in relation to fishery data and an opinion is expressed on whether or not the status of the fish populations is sufficient to tolerate a higher fishing pressure. These decisions are linked to monitoring results (CPUE, pre-recruitment surveys, test fishing). Normally licenses are valid for 3 or 5 years. Fishermen must apply to the relevant county to be able to use trap nets even if he owns the water area in which he fishes.



3.5.7 Compliance and Enforcement

Surveillance and enforcement is carried out by the County Boards, which have combined resources for a patrol vessel. They control fishing activities by both commercial and recreational fishermen, although within private waters (closer than 300 m from the shoreline) a limited amount of fishing effort is not subject to enforcement, but is monitored. Regular, unannounced, inspections are carried out by the county boards and scientists are closely involved with the monitoring of fishing activities. There is also effective self-policing by fishermen and merchants with strong social controls.

Non-compliant gear can be confiscated, fines can be applied and licences removed or not renewed for repeat offences. These measures are agreed, tested and codified. The nature of the fishery makes monitoring and control relatively straightforward.

Fishermen's organisations, including most fishers, are fully informed of requirements. Any other changes in the management system are discussed with the fishermen through established procedures. Information and training is provided in the aims of the system and key factors such as care of undersize individuals to maximise survivorship. Fishermen are actively engaged in data collection and support the aims of management bodies, showing both knowledge and support of the aims of the management system. Awareness of management measures, and compliance with these, appears very good.

3.5.8 Research Planning

SUA scientists make regular samplings to monitor catches (Figs. 7, 11, 12), fishing intensity, CPUE (Fig. 8), pikeperch recruitment (Figs. 9, 12) and the fish community as a whole (Figs. 6, 13) and these activities will be continued (U.Beier, SUA, pers comm, 2011) to also meet requirements within the Water Framework Directive. These research activities are often undertaken together with fishermen.

Managers and scientists are aware of research undertaken by other institutions, and where relevant this is taken into account in the management of this fishery. Cooperative research with other lakes/organisations has been undertaken.

3.5.9 Monitoring and Evaluation of Management Performance

Mechanisms exist for internal reviews of the success or otherwise of the management system between scientists, managers and fishermen. In particular, internal reviews are carried out within the three county boards and in the formation of joint management plans and SUA are currently investigating development of a stock assessment model for the pikeperch population. External reviews are also undertaken – the last in response to a condition of certification from the first MSC assessment of the fishery. This was undertaken by Bengt Sjostrand (a retired Senior Fisheries researcher who still sits on the panel of KRAV), Bengt completed the review in 2009.

4. Evaluation Procedure

4.1 Harmonised Fishery Assessment

There are no overlapping fisheries.

4.2 Previous assessments

This fishery has previously been assessed under MSC standards in 2006. The overall conclusion was that the fishery was managed in a manner consistent with the requirements of the MSC standard and a certificate was issued for the fishery valid for the period August 2006- August 2012. The client for this original certification was WWF Sweden. For this second certification assessment period the client is the Lake Hjälmaren fisherman's organisation themselves who have received funding from the Swedish lottery to allow them to take over this certification phase of their fishery.

Following the first certification process, five conditions were placed on the fishery and two further optional recommendations were also suggested by the assessment team. The progress of meeting these conditions has been monitored annually during the surveillance audits (surveillance audit reports are available from the MSC website www.msc.org). All of the conditions were met and closed out with the exception of condition 3 relating to the ecosystem, where although the condition was considered as being met, it was felt that it would be beneficial to the fishery to keep this condition open to allow continuation of data collection. A summary of the condition requirements and the actions by the fishery, which allowed them to be closed, are provided in Table 4.2.

Table 4.2. Summary of Previous Assessment Conditions

| Condition | Closed? (Y/N) | Justification |
|---|------------------|---|
| <p>1: Reference levels & decision rules There is an ongoing, implicit, analysis of stock status relative to historical information which allows forecasts to be made for the pikeperch stock and management actions to be taken. However, there are neither formalised reference/action points nor a documented, agreed, action plan (decision rules) to be put in place as and when stock levels reach such reference levels. This is potentially problematic if additional licensed gears, not currently used, were to be activated, thereby increasing total effort. Management agencies shall formalise appropriate reference level(s) and corresponding actions. Agencies may wish to consider an approach based upon precautionary and limit reference levels.</p> | Y | <p>The Pike-perch recruitment index and CPUE research monitoring programme continues and will do so for the foreseeable future. Draft reference levels were in place for the fishery at the second surveillance audit (September 2008). Since then further statistical analysis has been undertaken by the Swedish National Board of Fisheries on the above data sets and these draft reference levels have now been formalised.</p> <p>Appropriate management solutions (corresponding action plans) have also been implemented for the fishery. These include the reduction in both the gill net length (from an average of 4000m to approximately 2200m per fisherman) and the number of trap net positions made available to the fishermen. This measure has already been implemented and is designed to prevent an increase in fishing effort following a reduction in recruitment. Additional measures in place include the ability to limit the number of licences issued for both fisheries prior to low recruitment years entering the fishery (some 3-5 years following recruitment).</p> |
| <p>1. Sex ratio and size at age Age structure of pikeperch is suitably well established but there is no monitoring of sex structure in catches nor of size at age. To determine any shifts in population structure that could affect reproductive capacity, sex composition and size (both weight and length) at age should be established in catches. Size at age is also a good indicator of changes in feeding conditions (ecosystem conditions).</p> | Y | <p>A 3 year research period began in 2007 with otoliths being collected from filleted pike-perch (200 samples have so far been collected to provide age related data). In addition, a genetic study of the Lake's pike-perch populations was undertaken by the Swedish research council, independently of the fishery and this research also studied otolith samples.</p> <p>Monitoring of sex structure in catches was also implemented and the programme provided good information on the sex and age structure of the population.</p> |
| <p>2. Ecosystem objectives</p> | N but not | The water management organisation of the lake |

| Condition | Closed? (Y/N) | Justification |
|---|---|--|
| <p>As for the pikeperch stock, there is an ongoing analysis of commercial species stock status relative to historical data which would allow management actions to be taken as appropriate to modify fishing pressure. However, management objectives are not explicitly stated.</p> <p>It is not obvious that ecosystem shifts would arise from current fishing activity. However, as a number of species are taken in the fishery, and pikeperch (the main target species) is a top predator in the system, this is possible. Monitoring of target and by-catch species in catches, and scientific monitoring of key prey species such as smelt and roach, should therefore be undertaken. A plan of possible scenarios and corresponding responses should then be developed. This work should integrate with any other wider ecosystem monitoring (e.g. water quality, plankton) undertaken in the lake, as appropriate.</p> | <p>because the condition was not met but because it was felt further information collection and monitoring would be beneficial for the fishery.</p> | <p>monitors the water quality, phytoplankton, zooplankton and benthic invertebrates. Water quality data, in particular nitrogen and phosphorus, are important as indicators of lake productivity.</p> <p>A test fishing program (according to the European standard) with multi mesh gill-nets began in August 2006 in a part of Lake Hjälmaren (Mellanfjärden), which is considered to be the most important nursery area for pikeperch in the lake. This test fishing will also yield good data concerning the whole fish community and additional data concerning the recruitment of pikeperch. The gill-net catch provides a measure of the recruitment of pikeperch at least one year before the same year class will be caught in the fish-traps. Otoliths for ageing are also sampled from the pikeperch and good information on the bycatch is provided. The Test fishing programme continues every August (and will do for the foreseeable future) with the information collected used to produce annual reports detailing length-frequency distribution charts for all the different species & recording the lake's fish population structure, number and distribution using multi mesh gill nets and trawls with echo-sounder for fish location at specific locations across the lake. Length-frequency data, species statistics and otoliths are all collected for analysis and the findings are presented within an annual report. During August two persons will accompany four fishermen distributed over the lake and record all species of fish caught, count all specimens and measure the length of all fish caught in the fish-traps. As these fish-traps have fairly small mesh size, a number of other fish species will be caught. This will, in the long run, give results concerning the status of the populations of most species in the lake. Species not caught in these gears are mainly smelt (<i>Osmerus eperlanus</i>), ruffe (<i>Acerina cernua</i>) and rudd (<i>Scardinius erythrophthalmus</i>). Smelt and ruffe will, however, be caught in the test fishing gill-nets. Rudd occur very close to shore, mostly among reeds, and is unimportant as a prey species</p> <p>The Water Management Authority continues to monitor water quality, plankton and benthic invertebrates of Lake Hjälmaren as a measure of lake productivity. Results of such monitoring are made publicly available and are collated and integrated with the current work relating to the fishery. A review of the current monitoring results has been undertaken and the assessment team are satisfied that an appropriate data set is being collated and that the requirements of this condition are being met. All such data are regularly evaluated by the management team and it is possible to impose restrictions on the fishery should evidence indicate that a modification of fishing pressure is</p> |

| Condition | Closed? (Y/N) | Justification |
|---|------------------|---|
| | | <p>required.</p> <p>There are no plans to curtail this monitoring which is considered as being a beneficial result of the certification process.</p> <p>The new management authority wish to continue with an ecosystem based approach to fishery management (U.Beier, pers comm, 2011). Environmental monitoring continues to be undertaken on the Lake in keeping with the requirements from the Water Framework Directive.</p> |
| <p>3. Recording of any bird-bycatch Action required: There is some incidental catch of piscivorous birds in fish traps and possibly also in gill-nets under open water conditions. Numbers of birds caught should be recorded and this data evaluated by relevant organisations in terms of its significance for affected populations. If significant, appropriate mitigation measured should be put in place.</p> | Y | <p>Numbers of birds were recorded by the fishermen, and the results confirmed the expectations that captures are of cormorants only and are low in numbers and are recorded from the trap net fishery only (the gill net fishery taking place under ice).</p> <p>Monitoring continued for a number of years to allow a data set to be built up. Overall the numbers of incidents were very low and it was assessed that no mitigation would be required and evaluation of the data would not be necessary.</p> <p>The cormorant population of Lake Hjälmaren is subject to an annual cull of approximately 2000 birds per annum as the population is assessed by the government as being too large. The very low number of birds caught in the traps per annum (<5 incidents recorded) are not considered to have any threat to the population of this species on the Lake. The CAB was satisfied that enough evidence had been collected and this condition was closed.</p> |
| <p>4. External review An external review programme (independent of the current management authorities, contractors etc) of the management system should be implemented. This should be conducted on a periodic basis appropriate to the fishery. This could be undertaken, for example, by the Swedish Fishery Secretariat (Fiskesekretariatet).</p> | | <p>The client felt that the suggested Swedish Fishery Secretariat has very close relations with the client and may therefore be regarded as less suitable as an external reviewer</p> <p>WWF Sweden suggested Bengt Sjostrand (a retired Senior Fisheries researcher who still sits on the panel of KRAV) as an appropriate alternative to complete the review. Bengt completed the review in 2009.</p> |

4.3 Assessment Methodologies

This fishery has been assessed against MSC Certification Requirements version 1.1, and reported using MSC Full Assessment Reporting Template version 1.



The MSC default assessment tree was used without adjustment. The Risk Based Framework was not used at the initial Site Visit but was later used in a SICA workshop via teleconference. No comments were received from the stakeholders with regard to the either the MSC certification requirements or the assessment default tree.

4.4 Evaluation Processes and Techniques

Meetings were held at Lake Hjälmaren (Lennart Karlsson's fish dock/house at Lake Hjälmaren; 20 Sep 2011) and in Stockholm (21 Sep 2011). Attending were:

| | |
|---------------------------|-------------------------------|
| Auditor: | S Davies |
| Team Members: | S Hansson |
| ASI auditor: | Wetjens Dimmlich |
| Client: | Jan Erik Eriksson |
| Stakeholders: | |
| Dept of Aquatic Resources | Ulrika Beier |
| Fisherman | Lennart Karlsson and 2 others |

A Risk Based assessment Framework meeting was held by teleconference on 15 November 2012 (see below for details). Attending were:

| | |
|---------------------------|------------------------------------|
| Auditor: | A Hough |
| Team Members: | S Hansson |
| Stakeholders: | |
| Client/Fishermen | Mats Ingermarsson, Anders Eriksson |
| Dept of Aquatic Resources | Ulrika Beier |
| WWF | Charlotta Jarnmark, Inger Naslund |
| MSC | Minna Epps, Vivien Shroeder |

4.4.1 Consultations

The meetings held are outlined above. All aspects of the fishery were discussed. Further information was obtained from WWF Sweden, the previous client for the certification and From the University of Agriculture, Dept of Aquatic Resources. Little comment was received by the CAB as the fishery is very small and has previously been certified.

4.4.2 Evaluation Techniques

This assessment was announced through direct email to stakeholders (list provide from previous assessments, surveillance audits and an update from the client and the previous client (WWF)) and a notice placed in Fishing News International; this is expected to provide contact with those known to be interested in the fishery, and also any other stakeholders not previously contacted.

The MSC Principles and Criteria set out the requirements of certified fishery. The certification methodology adopted by the MSC involves the interpretation of these Principles and Criteria into specific Performance Indicators and Scoring Guideposts against which the performance of Fishery can be measured. In order to make the assessment process as clear and transparent as possible, these identify the level of performance necessary to achieve 100, 80 (a pass score), and 60 scores for each Indicator.



This re-assessment used the Standard Assessment Tree set out in MSC Certification Requirements v1.1. Use of this assessment tree has been the subject of stakeholder consultation. No comments were received on the use of this Assessment Tree.

For each Performance Indicator, the performance of the fishery is assessed as a 'score'. In order for the fishery to achieve certification, an overall score of 80 is considered necessary for each of the three Principles, 100 represent ideal best practice and 60 a measurable shortfall. A fishery cannot be certified if a score below 60 is recorded. As it is not considered possible to allocate precise scores, a scoring interval of five is therefore used in evaluations. Scores are allocated based on the consensus opinion of the assessment team.

The Risk-Based Assessment process (RBF) was used in this assessment. The use of the RBF was notified to stakeholders in the fishery by email and via the MSC website. No comments were received on the use of the RBF.

However, through a priori assumptions of the assessment team based on previous assessments of the fishery, the RBF was not employed on the original site visit as it was expected that appropriate information would be made available from stakeholders. Recent changes in personnel at NBF and changes in emphasis of science away from Hjalmarén have led to concomitant changes in the information base for the fishery; analysis of the information provided has determined that appropriate information required to score the following PIs was not obtained: 1.1.1, 2.1.1, 2.2.1, 2.4.1, 2.5.1.

The information not available would be that allowing quantification of populations of target, retained and bycatch species, and providing evidence of the effects of the fishery on habitat/ecosystem structure and function. Accordingly IMM proposed, through a variation request to MSC, to carry out a further information gathering 'site visit' as per CR 27.9.4. This entailed a SICA workshop involving all elements of CR appendix CC. To avoid unnecessary costs to the client, and as a site visit has already taken place at Lake Hjalmarén, this additional information gathering and SICA workshop took the form of a teleconference.

The variation request highlighted that the assessment team are familiar with the nature of the fishery; a comprehensive site visit has already taken place; the stakeholders and assessment team are well known to each other and as this is a small-scale fishery we hope to minimise unnecessary costs to the client.

Information obtained is set out in Appendix 1.2. The most vulnerable scoring elements for each ecosystem component were chosen by common consensus among stakeholders at the RBF teleconference.

5 Traceability

5.1 Eligibility Date

5.2 Eligibility Date

The Target Eligibility Date is 20 February 2013. The fisheries are year-round and so this is 6 months prior to the due date for issuing the Public Comment Draft Report.



This is now confirmed as the actual eligibility date: **20 February 2013**

5.3 Traceability within the Fishery

Traceability within the fishery is considered to be adequate. Fishermen land at their own docks on the lake; all fish landed are from Lake Hjälmaren. Most fish entering future Chain of Custody are collected from the fishermen by CoC certified processors at the point of landing. There is no processing on the lake and no trans-shipping – landings are directly to the shore. Catches are reported and may be subject to inspection by fishery officers from the County Boards, presenting little opportunity for substitution/addition of fish from other lakes.

Occasionally some fishermen may drive their products into Stockholm for the weekly sale, but this is not currently CoC certified. The majority of the catch is distributed by processors for sale in Europe (mainly Germany).

5.4 Eligibility to Enter Further Chains of Custody

The tracking and traceability information is considered sufficient for the product of the fishery to be eligible to enter further certified chains of custody.

All licensed fishermen may supply product into further certified chains of custody. Eligible points of landing are all landing points on the shores of Lake Hjälmaren.

Change of ownership, and the point from which Chain of Custody (CoC) certification is required, is the purchase of pike perch from fishermen by processors. All processors wishing to sell MSC certified Lake Hjälmaren pikeperch will therefore require their own Chain of Custody certification.

5.5 Eligibility of Inseparable or Practically Inseparable (IPI) stock(s) to Enter Further Chains of Custody

No IPI stock(s) are involved in this certification.

6 Evaluation Results

6.1 Principle Level Scores

Table 6.1: Final Principle Scores

Both the gill-net and fish-trap fishery achieved the same scores for each PI. The rationale for each is presented in the scoring table (Appendix 1) and, where appropriate, in the Risk-Based Framework section (Appendix 1.2).

| Final Principle Scores – Gill-Net Fishery | |
|--|--------------|
| Principle | Score |
| Principle 1 – Target Species | 82 |
| Principle 2 – Ecosystem | 87 |
| Principle 3 – Management System | 84 |

| Final Principle Scores – Fish-Trap Fishery | |
|--|-------|
| Principle | Score |
| Principle 1 – Target Species | 82 |
| Principle 2 – Ecosystem | 87 |
| Principle 3 – Management System | 84 |

6.2 Summary of Scores – for both Units of Certification

| Prin- ciple | Wt (L1) | Component | Wt (L2) | PI No. | Performance Indicator (PI) | Weight in | | | | Score |
|----------------|------------|------------------------------------|------------|--------|------------------------------------|-----------|--------|-------|--------|-------|
| | | | | | | Either | | Or | | |
| One | 1 | Outcome | 0.5 | 1.1.1 | Stock status | 0.5 | 0.25 | 0.333 | 0.1667 | 90 |
| | | | | 1.1.2 | Reference points | 0.5 | 0.25 | 0.333 | 0.1667 | 80 |
| | | | | 1.1.3 | Stock rebuilding | | | 0.333 | 0.1667 | |
| | | Management | 0.5 | 1.2.1 | Harvest strategy | 0.25 | 0.125 | | | 80 |
| | | | | 1.2.2 | Harvest control rules & tools | 0.25 | 0.125 | | | 75 |
| | | | | 1.2.3 | Information & monitoring | 0.25 | 0.125 | | | 80 |
| | | | | 1.2.4 | Assessment of stock status | 0.25 | 0.125 | | | 80 |
| Two | 1 | Retained species | 0.2 | 2.1.1 | Outcome | 0.333 | 0.0667 | | | 80 |
| | | | | 2.1.2 | Management | 0.333 | 0.0667 | | | 80 |
| | | | | 2.1.3 | Information | 0.333 | 0.0667 | | | 90 |
| | | Bycatch | 0.2 | 2.2.1 | Outcome | 0.333 | 0.0667 | | | 100 |
| | | | | 2.2.2 | Management | 0.333 | 0.0667 | | | 80 |
| | | | | 2.2.3 | Information | 0.333 | 0.0667 | | | 100 |
| | | ETP species | 0.2 | 2.3.1 | Outcome | 0.333 | 0.0667 | | | 100 |
| | | | | 2.3.2 | Management | 0.333 | 0.0667 | | | 80 |
| | | | | 2.3.3 | Information | 0.333 | 0.0667 | | | 85 |
| | | Habitats | 0.2 | 2.4.1 | Outcome | 0.333 | 0.0667 | | | 100 |
| | | | | 2.4.2 | Management | 0.333 | 0.0667 | | | 80 |
| | | | | 2.4.3 | Information | 0.333 | 0.0667 | | | 80 |
| | | Trophic function | 0.2 | 2.5.1 | Outcome | 0.333 | 0.0667 | | | 80 |
| | | | | 2.5.2 | Management | 0.333 | 0.0667 | | | 80 |
| | | | | 2.5.3 | Information | 0.333 | 0.0667 | | | 95 |
| Three | 1 | Governance and policy | 0.5 | 3.1.1 | Legal & customary framework | 0.25 | 0.125 | | | 100 |
| | | | | 3.1.2 | Consultation, roles & | 0.25 | 0.125 | | | 85 |
| | | | | 3.1.3 | Long term objectives | 0.25 | 0.125 | | | 80 |
| | | | | 3.1.4 | Incentives for sustainable fishing | 0.25 | 0.125 | | | 80 |
| | | Fishery specific management system | 0.5 | 3.2.1 | Fishery specific objectives | 0.2 | 0.1 | | | 80 |
| | | | | 3.2.2 | Decision making processes | 0.2 | 0.1 | | | 90 |
| | | | | 3.2.3 | Compliance & enforcement | 0.2 | 0.1 | | | 80 |
| | | | | 3.2.4 | Research plan | 0.2 | 0.1 | | | 80 |
| | | | | 3.2.5 | Management performance | 0.2 | 0.1 | | | 80 |

6.3 Summary of Conditions

Table 6.3: Summary of Conditions

| Condition number | Condition | Performance Indicator | Related to previously raised condition? (Y/N/N/A) |
|------------------|---------------------------------|-----------------------|---|
| 1 | Stock status | 1.1.1 | n/a |
| 2 | Harvest control rules and tools | 1.2.2 | N |

A condition is raised on stock status as the RBF SICA score for the stock was less than 80 – this means that the RBF cannot be used at the next re-assessment and so a stock assessment, with relevant reference points, will be required.

Note that the original assessment was not against the MSC standard FAM assessment tree. These same conditions will apply to both the fish trap and gill-net fisheries as these relate to stock status.

6.4 Determination, Formal Conclusion and Agreement

The fishery achieved a score of 80 or more against each MSC Principle, and did not score less than 60 for any Performance Indicator. The determination reached by the assessment team is therefore that the Lake Hjalmarén Pikeperch Fish-Trap Fishery and the Lake Hjalmarén Pikeperch Gill-Net Fishery each be certified against the MSC Standard for a well-managed and sustainable fishery.

This determination has been reviewed and confirmed on behalf of the Intertek Moody Marine Impartiality Committee.

References

Appelberg, M., Berger, H.-M., Hesthagen, T., Kleiven, E., Kttrkilahti, M., Raitaniemi, J., and Rask, M. 1995. Development and intercalibration of methods in Nordic freshwater fish monitoring. *Water, Air, and Soil Pollution*, 85:401-406.

Appelberg, M. 2000. Swedish standard methods for sampling freshwater fish with multi-mesh gillnets. *Fiskeriverket Information*, 1:1-33.

Beier, U. et al. 2013. (In prep.) Report: Data about fish and fisheries in Lake Hjälmaren. Swedish University of Agricultural Sciences, Department of Aquatic Resources, Institute of Freshwater Research.

Degerman E., Nyberg P., Sandström A. and Beier U. (2008) Höjt minimimått i Hjälmaren har resulterat i mer gös. *Fiskeritidskrift för Finland* 52, 10-11.

Lapalainen, J., Dorner, H., Wysujack, K. (2003). Reproductive biology of pikeperch (*Sander lucioperca* (L.)) – a review. *Ecology of Freshwater Fish* 12: 95-106.
<http://www.fishbase.org/summary/Sander-lucioperca.html>

Nilsson, S., Åkerman, S-E. and Engström, M. 2010. Hjälmaren verksamhetsplan 2010. Document from the counties of Södermanland, Västmanland and Örebro

Nyberg P., Degerman E. and Sers B. (1996) Survival after catch in trap-nets, movements and growth of the pikeperch (*Stizostedion lucioperca*) in Lake Hjälmaren, central Sweden. *Ann Zool Fenn* 33, 569-575.

Nyberg, P., Bergstrand, E., Degerman, E., and Enderlein, O. 2001. Recruitment of pelagic fish in an unstable climate: studies in Sweden's four largest lakes. *Ambio*, 30(8):559-564.

Sildén, L. and Strand, O. 2010. Storskarven i Hjälmaren 2010. Storskarven I Hjalmaren 2010. Närkes Ornitologiska Förening (study conducted with support from the County Board in Örebro).

Willen, E. 2001. Four decades of research on the Swedish large lakes Malaren, Hjalmaren, Vattern and Vanern: the significance of monitoring and remedial measures for a sustainable society. *Ambio*, 30: 458-466.

<https://www.havochvatten.se/en/start/about-us/publications.html>.

Appendices

Appendix 1 Scoring and Rationales

Appendix 1.1 Performance Indicator Scores and Rationale

Evaluation Table PI 1.1.1

| PI 1.1.1 | | The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing | |
|--------------------------------------|-------|--|--|
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| 60 | a | Y | It is likely that the stock is above the point where recruitment would be impaired. |
| | | | |
| 80 | a | Y | It is highly likely that the stock is above the point where recruitment would be impaired. |
| | | | |
| | b | Y | The stock is at or fluctuating around its target reference point. |
| 100 | a | Y | There is a high degree of certainty that the stock is above the point where recruitment would be impaired. |
| | | | The risk-based assessment framework was used for this PI. The score allocated was 90. See Appendix 1.2 for further information. |
| | b | | There is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years . |
| References | | Appendix 1.2 | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | 90 |
| CONDITION NUMBER (if relevant): | | | 1 |

Evaluation Table: PI 1.1.2

| PI 1.1.2 | | Limit and target reference points are appropriate for the stock | |
|--------------------------------------|-------|---|---|
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| 60 | a | Y | Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category. |
| | | | |
| 80 | a | Y | Reference points are appropriate for the stock and can be estimated. As the RBF was used for PI 1.1.1, the score for this PI is a default 80 (see MSC CR CC3.2.1) |
| | | | |
| | b | | The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity. |
| | | | |
| c | | The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome. | |
| | | | |
| d | | Key low trophic level species, the target reference point takes into account the ecological role of the stock. | |
| | | | |
| 100 | b | | The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of precautionary issues . |
| | | | |
| c | | | The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a higher level , and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty . |
| | | | |
| References | | Appendix 1.2 | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | 80 |
| CONDITION NUMBER (if relevant): | | | |

Evaluation Table: PI 1.1.3

| PI 1.1.3 | | Where the stock is depleted, there is evidence of stock rebuilding | |
|--------------------------------------|-------|---|---|
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| 60 | a | | Where stocks are depleted rebuilding strategies which have a reasonable expectation of success are in place. The stock is not considered to be depleted (PI 1.1.1 score >80) and so this PI is not required. |
| | | | |
| | b | | A rebuilding timeframe is specified for the depleted stock that is the shorter of 30 years or 3 times its generation time. For cases where 3 generations is less than 5 years, the rebuilding timeframe is up to 5 years. |
| 80 | a | | Where stocks are depleted rebuilding strategies are in place. |
| | | | |
| | b | | A rebuilding timeframe is specified for the depleted stock that is the shorter of 20 years or 2 times its generation time . For cases where 2 generations is less than 5 years, the rebuilding timeframe is up to 5 years. |
| c | | Monitoring is in place to determine whether they are effective in rebuilding the stock within a specified timeframe. | |
| | | | |
| 100 | a | | Where stocks are depleted, strategies are demonstrated to be rebuilding stocks continuously and there is strong evidence that rebuilding will be complete within the specified timeframe . |
| | | | |
| | b | | The shortest practicable rebuilding timeframe is specified which does not exceed one generation time for the depleted stock. |
| References | | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | n/a |
| CONDITION NUMBER (if relevant): | | | |

Evaluation Table: PI 1.2.1

| PI 1.2.1 | | There is a robust and precautionary harvest strategy in place | |
|---|-------|---|---|
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| 60 | a | Y | The harvest strategy is expected to achieve stock management objectives reflected in the target and limit reference points. See 80 a) |
| | b | Y | The harvest strategy is likely to work based on prior experience or plausible argument. See 80 b) |
| | c | Y | Monitoring is in place that is expected to determine whether the harvest strategy is working. See 80 b) |
| 80 | a | Y | The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving management objectives reflected in the target and limit reference points. The overriding objective for the fishery is to maintain a sustainable commercial fishery in the lake. There are no quotas applied, but the rate of exploitation within the fishery is controlled by input controls. These are responsive to trends in a number of separate indices of the stock (CPUE, stock size composition and pre-recruit year-class strength) to ensure the fishery operates at a low risk of overfishing. |
| | b | Y | The harvest strategy may not have been fully tested but monitoring is in place and evidence exists that it is achieving its objectives. Data used is comprehensive and accurate and indices are appropriate for the stock; monitoring against these indices is ongoing. It is noted that further work is currently ongoing to develop a stock assessment model for the Hjalmsaren pikeperch. The consistently favourable status of the stock over recent years suggests that the strategy is successful in achieving objectives for the stock. |
| 100 | a | N | The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points. Management objectives are not stock specific and so the harvest strategy is not designed around these. |
| | b | N | The performance of the harvest strategy has been fully evaluated and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels. Evidence does not support there being a full evaluation of the harvest strategy. |
| | d | N | The harvest strategy is periodically reviewed and improved as necessary. Although work is underway on the fishery management regime (notably a stock assessment), no regular periodic review of the harvest strategy is indicated. |
| References | | | Site visit, Nyberg et al 1996, Degerman et al 2008, Bieir, U unpublished data, Nilsson et al 2010. |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | 80 |



| | | | |
|--|--------------|--|--------------------------------|
| PI 1.2.1 | | There is a robust and precautionary harvest strategy in place | |
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| CONDITION NUMBER (if relevant): | | | |

Evaluation Table: PI 1.2.2

| PI 1.2.2 | | There are well defined and effective harvest control rules in place | |
|-------------------|-------|---|---|
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| 60 | a | Y | Generally understood harvest rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached. |
| | | | There are a number of clearly understood management measures that can be taken in the event that there is a perceived risk of overfishing the stock (see Section 3.3.5). These are entirely consistent with the overall harvest strategy and will act to reduce the exploitation rate. |
| | c | Y | There is some evidence that tools used to implement harvest control rules are appropriate and effective in controlling exploitation. See 80 c) |
| 80 | a | N | Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached. |
| | | | As noted in 60 a) above, the management rules are well understood, but do not clearly define the sequencing of actions that would be undertaken should the risk of overfishing arise. The rules are therefore not considered to be well defined. |
| | b | Y | The selection of the harvest control rules takes into account the main uncertainties. |
| | | | The various indices used to monitor the stock, and effective monitoring of fishing activities, are sufficient to control for any uncertainties in either factor. Data on recruitment predict short-term (1-2 yrs) catch possibilities and may flag for temporary (inter annual) management adjustments in the fishery, while the age compositions and growth of fish in commercial catches provide information on the needs for long term changes in fishery. |
| | c | Y | Available evidence indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules. |
| | | | There is strong evidence that the increase in minimum size (input control) contributed to the current (and continuing) strength of the stock. Monitoring and further controls are expected to be effective in maintaining sustainable exploitation rates. |
| 100 | b | N | The design of the harvest control rules takes into account a wide range of uncertainties. |
| | | | There is no evidence of such consideration of uncertainties in designing harvest rules. |
| | c | N | Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules. There is not evidence of close coupling of tools and rules with exploitation rates under different stock situations, either practically or simulated. |
| References | | | Site visit, Nyberg et al 1996, Degerman et al 2008, Bieir, U unpublished data, Nilsson et al 2010. |



| | | | |
|---|--------------|--|--------------------------------|
| PI 1.2.2 | | There are well defined and effective harvest control rules in place | |
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | 75 |
| CONDITION NUMBER (if relevant): | | | 2 |

Evaluation Table: PI 1.2.3

| PI 1.2.3 | | Relevant information is collected to support the harvest strategy | |
|----------|-------|---|--|
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| 60 | a | Y | Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy. |
| | | | See 80 a) |
| | b | Y | Stock abundance and fishery removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule. |
| | | | See 80 b) |
| 80 | a | Y | Sufficient relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy. |
| | | | Accurate and robust fishery dependent indices are available on the abundance (CPUE) and composition (size composition) of the stock. These include a comprehensive test-fishing programme and scientific assessment of pre recruit-into-fishery fish. There is accurate landing data of commercial catches. County boards give permits for all trap nets and all locations are mapped; licensed fishermen are well known to regulators. Fishing sites are regularly inspected, as are recreational fishers. Gear use and fishing practices are well known. Important environmental information (notably late summer temperature) is coupled/correlated with pre-recruit surveys from commercial catches in estimating future stock status. This information is used by scientists and managers, and used in the regulation of the fishery. In the introduction of new/changed management actions, Data are regularly presented to the fishers, |
| | b | Y | Stock abundance and fishery removals are regularly monitored at a level of accuracy and coverage consistent with the harvest control rule , and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule. |
| | | | The indices of stock status and fishery removals continue to be monitored at the same resolution. |
| | c | Y | There is good information on all other fishery removals from the stock. |
| | | | Recreational catches are not recorded, but information and monitoring of fishing activity within the lake is sufficient to determine that this is not significant. The nature and extent of discards are well estimated by NBF and County Board managers. |
| 100 | a | N | A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly related to the current harvest strategy, is available. |
| | | | All information is available except for reliable information on stock abundance, although it is noted that work is underway on this. |
| | b | N | All information required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of inherent uncertainties in the information [data] and the robustness of assessment and management to this uncertainty. |



| | | | |
|---|--------------|--|--|
| PI 1.2.3 | | Relevant information is collected to support the harvest strategy | |
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| | | | Pre-recruit and CPUE data show consistent trends, but some uncertainties remain on the monitoring of the stock status. |
| References | | Site visit, Appelberg et al 1995, Appelberg, 2000, Nyberg et al 1996, Degerman et al 2008, Bieir, U unpublished data | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | 80 |
| CONDITION NUMBER (if relevant): | | | |

Evaluation Table: PI 1.2.4

| PI 1.2.4 | | There is an adequate assessment of the stock status | |
|---|-------|--|--|
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| 60 | b | Y | The assessment estimates stock status relative to reference points. |
| | | | [Insert as much text as required into every relevant SG issue] |
| 60 | c | Y | The assessment identifies major sources of uncertainty. |
| | | | |
| 80 | a | Y | The assessment is appropriate for the stock and for the harvest control rule. |
| | | | As the RBF was used for PI 1.1.1, this PI receives a default score of 80. |
| | c | | The assessment takes uncertainty into account . |
| | | | |
| e | | The assessment of stock status is subject to peer review. | |
| | | | |
| 100 | a | | The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery. |
| | | | |
| | c | | The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way. |
| | | | |
| d | | The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored. | |
| | | | |
| e | | The assessment has been internally and externally peer reviewed. | |
| | | | |
| References | | Appendix 1.2 | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | 80 |
| CONDITION NUMBER (if relevant): | | | |

Evaluation Table: PI 2.1.1

| PI 2.1.1 | | The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species | |
|-------------------------------------|-------|--|--|
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| 60 | a | Y | Main retained species are likely to be within biologically based limits (if not, go to scoring issue d below). [Insert as much text as required into every relevant SG issue] |
| | c | Y | If main retained species are outside the limits there are measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding of the depleted species. |
| | d | Y | If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the retained species to be outside biologically based limits or hindering recovery. |
| 80 | a | Y | Main retained species are highly likely to be within biologically based limits (if not, go to scoring issue c below). The RBF was used for this PI; the outcome of the SICA assessment was an MSC score of 80. The PSA was not required. |
| | c | Y | If main retained species are outside the limits there is a partial strategy of demonstrably effective management measures in place such that the fishery does not hinder recovery and rebuilding. |
| 100 | a | N | There is a high degree of certainty that retained species are within biologically based limits and fluctuating around their target reference points. |
| | b | N | Target reference points are defined and retained species. |
| References | | Appendix 1.2 | |
| OVERALL PERFORMANCE INDICATOR SCORE | | | |
| Gill-net | | | 80 |
| Fish trap | | | 80 |
| CONDITION NUMBER (if relevant): | | | |

Evaluation Table: PI 2.1.2

| PI 2.1.2 | | There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species | |
|----------|-------|--|---|
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| 60 | a | Y | <p>There are measures in place, if necessary, that are expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.</p> <p>See 80 a)</p> |
| | b | Y | <p>The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species).</p> <p>See 80 b)</p> |
| 80 | a | Y | <p>There is a partial strategy in place, if necessary that is expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.</p> <p>There is a strategy in place for managing the effects of the fishery on the target species, pikeperch, based on effort limitations and handling of catches such that survivorship of discarded fish is maximised. Although there is not a specific strategy for retained species, the pikeperch harvest strategy represents an effective partial strategy to manage retained species in both the gill-net and fish trap fisheries. Use of the RBF has confirmed the view that the fishery would not hinder recovery of any depleted populations, should these arise.</p> |
| | b | Y | <p>There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or species involved.</p> <p>The target species, pikeperch, is seen to be in a healthy condition, the same situation will therefore be expected for non-target species; particularly as these are less valuable and unwanted individuals and small individuals of all species are returned to the lake with excellent survivorship. This is supported by test-fishing results to date. The test-fishing programme will determine any significant deterioration in the health of retained species populations.</p> |
| | c | Y | <p>There is some evidence that the partial strategy is being implemented successfully.</p> <p>The strategy for pikeperch has been successfully implemented and so the partial strategy will be also. Return of unwanted fish to the lake is readily observed at all fishing locations.</p> |
| 100 | a | N | <p>There is a strategy in place for managing retained species.</p> <p>There is not a specific strategy for retained species.</p> |
| | b | N | <p>Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or species involved.</p> <p>See 100 a)</p> |
| | c | N | <p>There is clear evidence that the strategy is being implemented successfully.</p> |

| | | | |
|--|--------------|---|---|
| PI 2.1.2 | | There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species | |
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| | | | See 100 a) |
| | d | N | There is some evidence that the strategy is achieving its overall objective . |
| | | | See 100 a) |
| References | | Site visit, Appelberg, 2000, Nyberg et al 1996, Degerman et al 2008, Bieir, U unpublished data, Nilsson et al 2010. | |
| OVERALL PERFORMANCE INDICATOR SCORE | | | |
| Gill-net | | | 80 |
| Fish trap | | | 80 |
| CONDITION NUMBER (if relevant): | | | |

Evaluation Table: PI 2.1.3

| PI 2.1.3 | | Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species | |
|----------|-------|--|---|
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| 60 | a | Y | <p>Qualitative information is available on the amount of main retained species taken by the fishery.</p> <p>See 100 a)</p> |
| | b | Y | <p>Information is adequate to qualitatively assess outcome status with respect to biologically based limits.</p> <p>[Scoring issue not scored as RBF used to score PI 2.1.1]</p> |
| | c | Y | <p>Information is adequate to support measures to manage main retained species.</p> <p>See 100 c)</p> |
| 80 | a | Y | <p>Qualitative information and some quantitative information are available on the amount of main retained species taken by the fishery.</p> <p>See 100 a)</p> |
| | b | - | <p>Information is sufficient to estimate outcome status with respect to biologically based limits.</p> <p>[Scoring issue not scored as RBF used to score PI 2.1.1]</p> |
| | c | Y | <p>Information is adequate to support a partial strategy to manage main retained species.</p> <p>See 100 c)</p> |
| | d | Y | <p>Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator score or the operation of the fishery or the effectiveness of the strategy)</p> <p>The test-fishing programme and CPUE data would detect any significant changes in risk level for the species concerned.</p> |
| 100 | a | Y | <p>Accurate and verifiable information is available on the catch of all retained species and the consequences for the status of affected populations.</p> <p>There is good quantitative information on landings and CPUE of commercial by-catch species from the fisherman's log books (compiled and statistically analysed in Gothenburg office before being sent to the University of Agriculture). As well as log-book and CPUE data, a test fishing program (according to the European standard) with multi mesh gill-nets began in August 2006 in a part of Lake Hjälmaren (Mellanfjärden) which is considered to be the most important nursery area for pikeperch in the lake. This test fishing also provides information on the status of the whole fish community.</p> |
| | b | - | <p>Information is sufficient to quantitatively estimate outcome status with a high degree of certainty.</p> <p>[Scoring issue not scored as RBF used to score PI 2.1.1]</p> |
| | c | Y | <p>Information is adequate to support a comprehensive strategy to manage retained species, and evaluate with a high degree of certainty whether the strategy is achieving its objective.</p> |

| | | | |
|--|--------------|---|---|
| PI 2.1.3 | | Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species | |
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| | | | Sufficient information is currently collected to support the development of an appropriate strategy to manage retained species. Continuation of data collection at present levels would allow evaluation of the success of such a strategy. |
| | d | N | Monitoring of retained species is conducted in sufficient detail to assess ongoing mortalities to all retained species. All ongoing mortalities (e.g. depredation of perch by sea eagles) are not monitored. |
| References | | Site visit, Appelberg et al 1995, Appelberg, 2000, Nyberg et al 1996, Degerman et al 2008, Bieir, U unpublished data. | |
| OVERALL PERFORMANCE INDICATOR SCORE | | | |
| Gill-net | | | 90 |
| Fish trap | | | 90 |
| CONDITION NUMBER (if relevant): | | | |

Evaluation Table: PI 2.2.1

| PI 2.2.1 | | The fishery does not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups | |
|--|-------|--|--|
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| 60 | a | Y | Main bycatch species are likely to be within biologically based limits (if not, go to scoring issue b below). See 100 a) |
| | b | Y | If main bycatch species are outside biologically based limits there are mitigation measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding. See 100 a) |
| | c | Y | If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the bycatch species to be outside biologically based limits or hindering recovery. See 100 a) |
| 80 | a | Y | Main bycatch species are highly likely to be within biologically based limits (if not, go to scoring issue b below). See 100 a) |
| | b | Y | If main bycatch species are outside biologically based limits there is a partial strategy of demonstrably effective mitigation measures in place such that the fishery does not hinder recovery and rebuilding. See 100 a) |
| 100 | a | Y | There is a high degree of certainty that bycatch species are within biologically based limits. For the gill-net fishery, there are no bycatch (discarded) species. For the fish trap fishery, the RBF was used (Appendix 1.2) with an outcome of an MSC score of 100. |
| References | | Site Visit Appendix 1.2 | |
| OVERALL PERFORMANCE INDICATOR SCORE | | | |
| Gill-net | | | 100 |
| Fish trap | | | 100 |
| CONDITION NUMBER (if relevant): | | | |

Evaluation Table: PI 2.2.2

| PI 2.2.2 | | There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations | |
|----------|-------|--|---|
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| 60 | a | Y | There are measures in place, if necessary, which are expected to maintain main bycatch species at levels which are highly likely to be within biologically based limits or to ensure that the fishery does not hinder their recovery. See 80 a) |
| | b | Y | The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/species). See 80 b) |
| 80 | a | Y | There is a partial strategy in place, if necessary, for managing bycatch species at levels which are highly likely to be within biologically based limits or to ensure that the fishery does not hinder their recovery. There is a strategy in place for managing the effects of the fishery on the target species, pikeperch. Although there is not a specific strategy for bycatch species, the pikeperch harvest strategy represents an effective partial strategy to manage bycatch species in both the gill-net and fish trap fisheries. Use of the RBF has confirmed the view that the fishery would not hinder recovery of any depleted populations, should these arise. |
| | b | Y | There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or the species involved. The target species, pikeperch, is seen to be in a healthy condition, the same situation will therefore be expected for non-target species; particularly as these are returned to the lake with excellent survivorship. The test-fishing programme will determine any significant deterioration in the health of bycatch species populations. |
| | c | Y | There is some evidence that the partial strategy is being implemented successfully. The strategy for pikeperch has been successfully implemented and so the partial strategy will be also. Return of unwanted fish to the lake is readily observed at all fishing locations. |
| 100 | a | N | There is a strategy in place for managing and minimising bycatch. There is not a specific strategy for retained species. |
| | b | N | Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or species involved. See 100 a) |
| | c | N | There is clear evidence that the strategy is being implemented successfully. See 100 a) |



| | | | |
|--|--------------|---|---|
| PI 2.2.2 | | There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations | |
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| | d | N | There is some evidence that the strategy is achieving its objective. See 100 a) |
| References | | Site visit, Appelberg, 2000, Nyberg et al 1996, Degerman et al 2008, Bieir, U unpublished data, Nilsson et al 2010. | |
| OVERALL PERFORMANCE INDICATOR SCORE | | | |
| Gill-net | | | 80 |
| Fish trap | | | 80 |
| CONDITION NUMBER (if relevant): | | | |

Evaluation Table: PI 2.2.3

| PI 2.2.3 | | Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch | |
|----------|-------|--|---|
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| 60 | a | Y | <p>Qualitative information is available on the main bycatch species affected by the fishery.</p> <p>See 100 a)</p> |
| | b | Y | <p>Information is adequate to broadly understand outcome status with respect to biologically based limits</p> <p>[Scoring issue not scored as RBF used to score PI 2.2.1]</p> |
| | c | Y | <p>Information is adequate to support measures to manage bycatch.</p> <p>See 100 c)</p> |
| 80 | a | Y | <p>Qualitative information and some quantitative information are available on the amount of main bycatch species affected by the fishery.</p> <p>See 100 a)</p> |
| | b | Y | <p>Information is sufficient to estimate outcome status with respect to biologically based limits.</p> <p>[Scoring issue not scored as RBF used to score PI 2.2.1]</p> |
| | c | Y | <p>Information is adequate to support a partial strategy to manage main bycatch species.</p> <p>See 100 c)</p> |
| | d | Y | <p>Sufficient data continue to be collected to detect any increase in risk to main bycatch species (e.g., due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the strategy).</p> <p>See 100 d)</p> |
| 100 | a | Y | <p>Accurate and verifiable information is available on the amount of all bycatch and the consequences for the status of affected populations.</p> <p>Fishing operations are routinely observed by managers and scientists. These confirm that there are no discarded species in the gill-net fishery. Discards in the fish trap fishery are minimal, with ruff being the most commonly caught (a species difficult to handle and of no commercial value as bait). In addition, a test fishing program (according to the European standard) with multi mesh gill-nets began in August 2006 in a part of Lake Hjälmaren (Mellanfjärden) which is considered to be the most important nursery area for pikeperch in the lake. This test fishing also provides information on the status of the whole fish community and would detect any significant variation.</p> |
| | b | Y | <p>Information is sufficient to quantitatively estimate outcome status with respect to biologically based limits with a high degree of certainty.</p> <p>[Scoring issue not scored as RBF used to score PI 2.2.1]</p> |

| PI 2.2.3 | | Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch | |
|--|-------|--|--|
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| | c | Y | Information is adequate to support a comprehensive strategy to manage bycatch, and evaluate with a high degree of certainty whether a strategy is achieving its objective . The most significant strategy is the return of unwanted fish (i.e. all bycatch species) to the lake with demonstrable excellent survivorship. |
| | d | Y | Monitoring of bycatch data is conducted in sufficient detail to assess ongoing mortalities to all bycatch species. Observations by managers and scientists, and test-fishing continue. |
| References | | Site visit, Appelberg et al 1995, Appelberg, 2000, Nyberg et al 1996, Degerman et al 2008, Bieir, U unpublished data. | |
| OVERALL PERFORMANCE INDICATOR SCORE | | | |
| Gill-net | | | 100 |
| Fish trap | | | 100 |
| CONDITION NUMBER (if relevant): | | | |

Evaluation Table: PI 2.3.1

| PI 2.3.1 | | The fishery meets national and international requirements for the protection of ETP species The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species | |
|----------|-------|--|--|
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| 60 | a | Y | Known effects of the fishery are likely to be within limits of national and international requirements for protection of ETP species. |
| | | | See 100 a) |
| | b | Y | Known direct effects are unlikely to create unacceptable impacts to ETP species. |
| | | | See 100 b) |
| 80 | a | Y | The effects of the fishery are known and are highly likely to be within limits of national and international requirements for protection of ETP species. |
| | | | See 100 a) |
| | b | Y | Direct effects are highly unlikely to create unacceptable impacts to ETP species. |
| | | | See 100 b) |
| | c | Y | Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts. |
| | | | See 100 c) |
| 100 | a | Y | There is a high degree of certainty that the effects of the fishery are within limits of national and international requirements for protection of ETP species. |
| | | | The only potentially adverse effect of the fishery on any ETP species was considered to be possible mortality of piscivorous birds. This has been monitored as a result of a condition of the original assessment and no significant direct effects were identified, and certainly not beyond the limits of national and international protection. A potential indirect effect is a cull of cormorants within Swedish Lakes, including Hjalmarén. This is a licensed activity with culled individuals within specified and monitored limits, entirely consistent with Swedish Law. |
| | b | Y | There is a high degree of confidence that there are no significant detrimental direct effects of the fishery on ETP species. |
| | | | As for a) above, the only potential effect on piscivorous birds has been investigated and shown not to have significant detrimental direct effects (i.e. capture and mortality). |
| | c | Y | There is a high degree of confidence that there are no significant detrimental indirect effects of the fishery on ETP species. |
| | | | There are no ETP species which would be indirectly affected through loss of prey or habitat etc. The effects of a cull of cormorants within Lake Hjalmarén have been studied and found not to be having a significant detrimental effect on the local population. The only other indirect effect, feeding some bycatches to ospreys and sea eagles during the winter, would be a positive effect. |



| | |
|--|--|
| References | Site visit. (Intertek), Silden and Strand 2010, Moody Marine initial certification record and subsequent surveillance reports. |
| OVERALL PERFORMANCE INDICATOR SCORE | |
| Gill-net | 100 |
| Fish trap | 100 |
| CONDITION NUMBER (if relevant): | |

Evaluation Table: PI 2.3.2

| PI 2.3.2 | | | <p>The fishery has in place precautionary management strategies designed to:</p> <ul style="list-style-type: none"> • Meet national and international requirements; • Ensure the fishery does not pose a risk of serious harm to ETP species; • Ensure the fishery does not hinder recovery of ETP species; and • Minimise mortality of ETP species. |
|----------|-------|------------|---|
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| 60 | a | Y | <p>There are measures in place that minimise mortality, and are expected to be highly likely to achieve national and international requirements for the protection of ETP species.</p> <p>See 80 a)</p> |
| | b | Y | <p>The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species).</p> <p>See 80 b)</p> |
| 80 | a | Y | <p>There is a strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality, that is designed to be highly likely to achieve national and international requirements for the protection of ETP species.</p> <p>There are various strategies in place in Sweden for the protection of ETP species – notably linked to the EC Birds Directive and Habitats Directive. As noted above, the fishery does not have direct or indirect effects on ETP species, but the nature conservation management framework will apply to the lake as a whole, including the fishery. The nature of the fishery means that interactions with ETP species would be unlikely.</p> |
| | b | Y | <p>There is an objective basis for confidence that the strategy will work, based on information directly about the fishery and/or the species involved.</p> <p>Information on the fishery supports there being no significant adverse effects. Monitoring is in place to determine the effectiveness of overall nature conservation management strategies.</p> |
| | c | Y | <p>There is evidence that the strategy is being implemented successfully.</p> <p>Evidence is provided through Swedish national monitoring programmes.</p> |
| 100 | a | N | <p>There is a comprehensive strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality that is designed to achieve above national and international requirements for the protection of ETP species.</p> <p>Evidence has not been provided that strategies are comprehensive.</p> |
| | b | N | <p>The strategy is mainly based on information directly about the fishery and/or species involved, and a quantitative analysis supports high confidence that the strategy will work.</p> <p>There is not a strategy directly linked to the fishery</p> |
| | c | N | <p>There is clear evidence that the strategy is being implemented successfully.</p> |

| PI 2.3.2 | | | <p>The fishery has in place precautionary management strategies designed to:</p> <ul style="list-style-type: none"> • Meet national and international requirements; • Ensure the fishery does not pose a risk of serious harm to ETP species; • Ensure the fishery does not hinder recovery of ETP species; and • Minimise mortality of ETP species. |
|--|-------|------------|--|
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| | | | See 100 b) |
| | d | N | There is evidence that the strategy is achieving its objective. |
| | | | See 100 b) |
| References | | | Site visit. |
| OVERALL PERFORMANCE INDICATOR SCORE | | | |
| Gill-net | | | 80 |
| Fish trap | | | 80 |
| CONDITION NUMBER (if relevant): | | | |

Evaluation Table: PI 2.3.3

| PI 2.3.3 | | <p>Relevant information is collected to support the management of fishery impacts on ETP species including:</p> <ul style="list-style-type: none"> Information for the development of the management strategy; Information to assess the effectiveness of the management strategy; and Information to determine the outcome status of ETP species. | |
|----------|-------|---|--|
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| 60 | a | Y | Information is sufficient to qualitatively estimate the fishery related mortality of ETP species. See 100 a) |
| | b | Y | Information is adequate to broadly understand the impact of the fishery on ETP species. See 80 b) |
| | c | Y | Information is adequate to support measures to manage the impacts on ETP species. See 80 c) |
| 80 | a | Y | Sufficient data are available to allow fishery related mortality and the impact of fishing to be quantitatively estimated for ETP species. See 100 a) |
| | b | Y | Information is sufficient to determine whether the fishery may be a threat to protection and recovery of the ETP species. There is sufficient information to determine that the fishery is not a threat to protection or recovery of ETP species; the only question from the original MSC assessment was over piscivorous birds and this has now been addressed. |
| | c | Y | Information is sufficient to measure trends and support a full strategy to manage impacts on ETP species. The overall monitoring of nature conservation and ecological status in the lake is sufficient to determine any trends in ETP species and to support management strategies. |
| 100 | a | Y | Information is sufficient to quantitatively estimate outcome status of ETP species with a high degree of certainty. Information is sufficient to determine that the fishery does not affect the outcome status of any ETP species present in the lake; this has now been determined quantitatively for piscivorous birds. |
| | b | N | Accurate and verifiable information is available on the magnitude of all impacts, mortalities and injuries and the consequences for the status of ETP species. Information related to the fishery is not at this level of precision; due to their being no need for monitoring at this level. |

| PI 2.3.3 | | <p>Relevant information is collected to support the management of fishery impacts on ETP species including:</p> <ul style="list-style-type: none"> Information for the development of the management strategy; Information to assess the effectiveness of the management strategy; and Information to determine the outcome status of ETP species. | |
|---|-------|---|---|
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| | c | N | <p>Information is adequate to support a comprehensive strategy to manage impacts, minimise mortality and injury of ETP species, and evaluate with a high degree of certainty whether a strategy is achieving its objectives.</p> <p>As for 100 b)</p> |
| References | | Site visit, Silden and Strand 2010 | |
| OVERALL PERFORMANCE INDICATOR SCORE Gill-net Fish trap | | | 85 85 |
| CONDITION NUMBER (if relevant): | | | |

Evaluation Table: PI 2.4.1

| PI 2.4.1 | | The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis and function | |
|--|-------|--|--|
| SG | Issue | Met? (Y/P/N) | Justification/Rationale |
| 60 | a | Y | The fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. |
| 80 | a | Y | The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. |
| 100 | a | Y | There is evidence that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. RBF is used to evaluate this PI – see Appendix 1.2. |
| References | | Appendix 1.2 | |
| OVERALL PERFORMANCE INDICATOR SCORE | | | |
| Gill-net | | | 100 |
| Fish trap | | | 100 |
| CONDITION NUMBER (if relevant): | | | |

Evaluation Table: PI 2.4.2

| PI 2.4.2 | | There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types | |
|-------------------|-------|---|--|
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| 60 | a | Y | There are measures in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance. See 80 a) |
| | b | Y | The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/habitats). See 80 b) |
| 80 | a | Y | There is a partial strategy in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above. The operation of the fishery, accompanied by regulation and monitoring, comprise a partial strategy that is considered by all concerned to achieve the habitat outcome SG 80 level of performance. |
| | b | Y | There is some objective basis for confidence that the partial strategy will work, based on information directly about the fishery and/or habitats involved. Information on the fishery, from all affected parties, provides confidence that the partial strategy has worked and will continue to do so. In particular, the location of fishing operations is very well known and traps are moved little if at all between years. All locations are known on an annual basis and fish trap locations are mapped and subject to inspection. Traps are placed in areas of sand and muddy sand with steeply sloping lake bed; stony areas and macrophytes are avoided as these damage the net and allow fish to escape the net. Gill-nets are entirely pelagic– thereby not affecting the bottom of the lake. |
| | c | Y | There is some evidence that the partial strategy is being implemented successfully. Evidence from regular monitoring of the fishery shows successful implementation of the 'partial strategy'. |
| 100 | a | N | There is a strategy in place for managing the impact of the fishery on habitat types. There is not a formal fishery strategy related to habitats. |
| | b | N | Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or habitats involved. See 100 a) |
| | c | N | There is clear evidence that that strategy is being implemented successfully. See 100 a) |
| | d | N | There is some evidence that the strategy is achieving its objective. See 100 a) |
| References | | Site visit. Nilsson et al 2010. | |



| | | | |
|--|--------------|--|--------------------------------|
| PI 2.4.2 | | There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types | |
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| OVERALL PERFORMANCE INDICATOR SCORE | | | |
| Gill-net | | | 80 |
| Fish trap | | | 80 |
| CONDITION NUMBER (if relevant): | | | |

Evaluation Table: PI 2.4.3

| PI 2.4.3 | | Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types | |
|--|-------|--|---|
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| 60 | a | Y | There is basic understanding of the types and distribution of main habitats in the area of the fishery. |
| | | | See 80 a) |
| | b | Y | Information is adequate to broadly understand the nature of the main impacts of gear use on the main habitats, including spatial overlap of habitat with fishing gear. |
| | | | See 80 b) |
| 80 | a | Y | The nature, distribution and vulnerability of all main habitat types in the fishery are known at a level of detail relevant to the scale and intensity of the fishery. |
| | | | Bathymetry of the lake is well determined, aiding identification of, among other things, important pikeperch spawning areas. Habitat types around the lake edge, including more vulnerable macrophyte beds, are well known. Knowledge is consistent with that required by the scale and intensity of the fishery. |
| | b | Y | Sufficient data are available to allow the nature of the impacts of the fishery on habitat types to be identified and there is reliable information on the spatial extent of interaction, and the timing and location of use of the fishing gear. |
| | | | Sufficient information is available, principally from monitoring of the fishery, to know the habitats within which the fishery is operating (i.e. fish trap locations). Location of gear is well known and mapped, timing of fishing is sufficiently well known. |
| | c | Y | Sufficient data continue to be collected to detect any increase in risk to habitat (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures). |
| | | | Monitoring of the fishery, and knowledge of lake habitats, continues in more than sufficient detail to detect any increases in risk of significant habitat damage. |
| 100 | a | N | The distribution of habitat types is known over their range, with particular attention to the occurrence of vulnerable habitat types. |
| | | | The precise distribution of habitat types is not fully known. |
| | b | N | The physical impacts of the gear on the habitat types have been quantified fully. |
| | | | Physical impacts have not been quantified – hence use of the RBF for PI 2.4.1. |
| | c | N | Changes in habitat distributions over time are measured. |
| | | | Habitat distributions are not precisely monitored. |
| References | | Site visit, Appelberg, 2000, Bieir, U unpublished data. | |
| OVERALL PERFORMANCE INDICATOR SCORE | | | |
| Gill-net | | | 80 |
| Fish trap | | | 80 |



| | |
|---------------------------------|--|
| CONDITION NUMBER (if relevant): | |
|---------------------------------|--|

Evaluation Table: PI 2.5.1

| PI 2.5.1 | | The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function | |
|--|-------|---|---|
| SG | Issue | Met? (Y/P/N) | Justification/Rationale |
| 60 | a | Y | The fishery is unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm. |
| 80 | a | Y | The fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm. The RBF has been used for this PI – See Appendix 1.2 |
| 100 | a | N | There is evidence that the fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm. |
| References | | Appendix 1.2 | |
| OVERALL PERFORMANCE INDICATOR SCORE | | | |
| Gill-net | | | 80 |
| Fish trap | | | 80 |
| CONDITION NUMBER (if relevant): | | | |

Evaluation Table: PI 2.5.2

| PI 2.5.2 | | There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function | |
|----------|-------|--|--|
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| 60 | a | Y | There are measures in place, if necessary. |
| | | | See 80 a) |
| | b | Y | The measures take into account potential impacts of the fishery on key elements of the ecosystem. |
| | | | See 80 b) |
| | c | Y | The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems). |
| | | | See 80 c) |
| 80 | a | Y | There is a partial strategy in place, if necessary. |
| | | | The operation of the fishery, accompanied by regulation and monitoring, comprise a partial strategy that is considered by all concerned to achieve the SG 80 level of performance. |
| | b | Y | The partial strategy takes into account available information and is expected to restrain impacts of the fishery on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance. |
| | | | Information on ecosystem components (notably target species, bycatch species but also ETP species and lake hydrology and productivity) are all considered in the management and operation of the pikeperch and other fisheries in the lake. As detailed in the Principle 1 and 2 PIs above, the partial strategy is expected to achieve 80 levels of performance in relation to target species, retained and bycatch species, ETP species and habitats. The potential for the fishery to disrupt trophic structure and function was considered by stakeholders in the RBF workshop (PI 2.5.1) and was found not to be significant. Nevertheless, information on lake productivity is available to, and considered by, scientists and managers. |
| | c | Y | The partial strategy is considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems). |
| | | | The level of effect associated with the fishery as it is currently managed and operates is considered by the assessment team and stakeholders to be effective; particularly considering the outcomes of monitoring to date. |
| d | Y | There is some evidence that the measures comprising the partial strategy are being implemented successfully . | |
| | | Monitoring and surveillance demonstrated effective implementation of the partial strategy. | |
| 100 | a | N | There is a strategy that consists of a plan , in place. |
| | | | There is no formal strategy for maintenance of the ecosystem as a whole in relation to fishery impacts. |

| PI 2.5.2 | | There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function | |
|--|----------|--|--|
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| | b | N | <p>The strategy, which consists of a plan, contains measures to address all main impacts of the fishery on the ecosystem, and at least some of these measures are in place. The plan and measures are based on well-understood functional relationships between the fishery and the Components and elements of the ecosystem.</p> <p>This plan provides for development of a full strategy that restrains impacts on the ecosystem to ensure the fishery does not cause serious or irreversible harm.</p> <p>See 100 a)</p> |
| | c | N | <p>The measures are considered likely to work based on prior experience, plausible argument or information directly from the fishery/ecosystems involved.</p> <p>See 100 a)</p> |
| | d | N | <p>There is evidence that the measures are being implemented successfully.</p> <p>See 100 a)</p> |
| References | | Site visit. | |
| OVERALL PERFORMANCE INDICATOR SCORE | | | |
| Gill-net | | | 80 |
| Fish trap | | | 80 |
| CONDITION NUMBER (if relevant): | | | |

Evaluation Table: PI 2.5.3

| PI 2.5.3 | | There is adequate knowledge of the impacts of the fishery on the ecosystem | |
|----------|-------|--|---|
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| 60 | a | | Information is adequate to identify the key elements of the ecosystem (e.g., trophic structure and function, community composition, productivity pattern and biodiversity). See 80 a) |
| | b | | Main impacts of the fishery on these key ecosystem elements can be inferred from existing information, and have not been investigated in detail . See 80 (b) |
| 80 | a | Y | Information is adequate to broadly understand the key elements of the ecosystem. Information from Hjalmlaren and other lake systems is sufficient to understand the key elements in the functioning of the lake ecosystem – i.e. trophic structure and function (particularly in relation to pikeperch, a top predator), community composition (both benthic and pelagic), productivity (particularly in relation to temperature and nutrient levels) and biodiversity. |
| | b | Y | Main impacts of the fishery on these key ecosystem elements can be inferred from existing information and some have been investigated in detail . The main impacts of the fishery on these elements can be inferred; stakeholders, using existing information on lake ecosystem function, and specific information on Lake Hjalmlaren, have inferred levels of impact of the fishery on ecosystem elements in the RBF workshop, with respect to retained/bycatch species, habitats and overall ecosystem function. Some interactions, such as with community composition and productivity have been investigated in detail. |
| | c | Y | The main functions of the Components (i.e., target, Bycatch, Retained and ETP species and Habitats) in the ecosystem are known . The main functions of the above ecosystem components are known in relation to functioning of lake ecosystems and in relation to the target species – see 100 (c). |
| | d | Y | Sufficient information is available on the impacts of the fishery on these Components to allow some of the main consequences for the ecosystem to be inferred. Information on effects of the fishery are sufficient to determine the main consequences for the ecosystem, as carried out in the RBF workshop – see 100 (d). |
| | e | Y | Sufficient data continue to be collected to detect any increase in risk level (e.g., due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures). |

| PI 2.5.3 | | There is adequate knowledge of the impacts of the fishery on the ecosystem | |
|----------|-------|--|--|
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| | | | Monitoring of the fishery, and general ecosystem characteristics in the lake, continue; this is sufficient to detect any factors which would increase the risk posed by the fishery. Most notable would be recruitment to the pikeperch population. |
| 100 | b | N | Main interactions between the fishery and these ecosystem elements can be inferred from existing information, and have been investigated . |
| | | | Not all interactions of the fishery with ecosystem elements have been specifically investigated. |
| | c | Y | <p>The impacts of the fishery on target, Bycatch and ETP species are identified and the main functions of these Components in the ecosystem are understood.</p> <p>The effects of the fishery on target, bycatch and ETP species have been identified – as discussed under earlier Principle 2 PIs., The functions of these species in the lake ecosystem are understood. Pikeperch is the most abundant piscivorous fish in Lake Hjälmaren, feeding on both pelagic (e.g. smelt, bleak) and demersal (e.g. roach and perch) fish. To some extent, pikeperch can be cannibalistic, allowing for a compensatory mechanism which may contribute to the population’s resilience to exploitation. The other specialist piscivorous fish in the lake, pike, is rather sedentary and not caught in any greater number in these fisheries. Perch, a commercially valuable bycatch in the pikeperch fishery, is benthivorous and piscivorous and very common in the lake. Perch caught in this fishery are generally large, piscivorous fish and (as in pikeperch) these are to some extent cannibalistic and the population hence reasonably resistant to fisheries. Smelt and bleak are primarily zooplanktivorous, while roach is both zooplanktivorous and benthivorous, Bream and white bream are common in the lake and are bycatches in the pikeperch fishery. They can be subjected to predation by pikeperch at young age, but with their high body they soon escape this predation and they are not caught in the pikeperch gears until they have reaches several years of age. Taken together, this makes the Lake Hjälmaren fish community reasonably resilient to the current fisheries management which is aiming at maintaining the pikeperch stock at a high level combined with a substantial fishing pressure on individuals exceeding 45cm (which have generally reached sexual maturity 2-3 years before captured). This evaluation is based not only from our understanding of this particular lake, but also from knowledge generated from many decades of research in the ecology of Swedish lakes. In the last decades, cormorants have started to nest at Lake Hjälmaren. Bycatches of these birds are small and negligible compared to the annual hunting. The colonisation by cormorants at this lake have taken place simultaneously as they have colonised other nearby lakes and coastal areas, indicating that the fishery in L. Hjälmares constitutes no problem for the establishment of this bird.</p> |
| d | Y | Sufficient information is available on the impacts of the fishery on the Components and elements to allow the main consequences for the ecosystem to be inferred. | |

| | | | |
|--|--------------|--|--|
| PI 2.5.3 | | There is adequate knowledge of the impacts of the fishery on the ecosystem | |
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| | | | Information is sufficient to infer the main consequences of the fishery for target (impacts on pikeperch have been described under Principle 1), Bycatch (although the RBF was used to determine effects on retained/bycatch species, information, notably from catch monitoring and test-fishing, is available on these) and ETP species (piscivorous birds which have been monitored in an earlier condition). If the pikeperch fishery were to cause any major perturbation in the lake ecosystem, these changes would be mediated through changes in the fish community. Such impacts would be detected as changes in abundances and size/age compositions of both targeted and bycatch fish species, and would be picked up in the monitoring of the fishery. There are currently no indications of major or even modest ecosystem effects of the pikeperch fishery. The pikeperch stock is high (CPUE data), recruitment good and with normal variation, and there are no indications that other fish populations are particularly impacted. |
| | e | Y | Information is sufficient to support the development of strategies to manage ecosystem impacts. Information is sufficient to support strategies for managing the pikeperch fishery to control effects on the lake ecosystem. As discussed for other Principle 2 PIs above, there is sufficient information available to allow strategies to be developed for each component of the ecosystem should these be required.. |
| References | | Site visit, Appelberg et al 1995, Appelberg, 2000, Nyberg et al 1996, Degerman et al 2008, Bieir, U unpublished data, Willen 2001. | |
| OVERALL PERFORMANCE INDICATOR SCORE | | | |
| Gill-net | | | 95 |
| Fish trap | | | 95 |
| CONDITION NUMBER (if relevant): | | | |

Evaluation Table: PI 3.1.1

| PI 3.1.1 | | <p>The management system exists within an appropriate legal and/or customary framework which ensures that it:</p> <ul style="list-style-type: none"> • Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; • Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and • Incorporates an appropriate dispute resolution framework. | |
|----------|-------|--|---|
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| 60 | a | Y | The management system is generally consistent with local, national or international laws or standards that are aimed at achieving sustainable fisheries in accordance with MSC Principles 1 and 2. |
| | | | The fishery is entirely domestic and so regulated by Swedish laws and standards. These operate in respect to fishery management and nature conservation objectives. The fishery appears entirely consistent with relevant laws. The overruling laws are in the Fiskelag (1993:787) and Miljöbalk (1998:808) and within the framework of these laws, the County Boards can decide on detailed and local rules. These local rules are regularly decided after contacts with stakeholders. |
| | b | Y | The management system incorporates or is subject by law to a mechanism for the resolution of legal disputes arising within the system. See 100 b) |
| | c | Y | Although the management authority or fishery may be subject to continuing court challenges, it is not indicating a disrespect or defiance of the law by repeatedly violating the same law or regulation necessary for the sustainability of the fishery. See 100 c) |
| | d | Y | The management system has a mechanism to generally respect the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2. See 100 d) |
| 80 | b | Y | The management system incorporates or is subject by law to a transparent mechanism for the resolution of legal disputes which is considered to be effective in dealing with most issues and that is appropriate to the context of the fishery. See 100 b) |
| | c | Y | The management system or fishery is attempting to comply in a timely fashion within binding judicial decisions arising from any legal challenges. See 100 c) |

| PI 3.1.1 | | <p>The management system exists within an appropriate legal and/or customary framework which ensures that it:</p> <ul style="list-style-type: none"> • Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; • Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and • Incorporates an appropriate dispute resolution framework. | |
|--------------------------------------|-------|--|--|
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| | d | Y | <p>The management system has a mechanism to observe the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.</p> <p>See 100 d)</p> |
| 100 | b | Y | <p>The management system incorporates or subject by law to a transparent mechanism for the resolution of legal disputes that is appropriate to the context of the fishery and has been tested and proven to be effective.</p> <p>Disputes within the fishery are discussed and resolved under the Swedish management system, initially through the county boards. Ultimately, complainants can take legal action, up to the European court of justice. These mechanisms have been tested widely, although not necessarily in this fishery.</p> |
| | c | Y | <p>The management system or fishery acts proactively to avoid legal disputes or rapidly implements binding judicial decisions arising from legal challenges.</p> <p>Fishery managers and fishers meet regularly and fishery management is closely tied to legal requirements; no legal challenges are known.</p> |
| | d | Y | <p>The management system has a mechanism to formally commit to the legal rights created explicitly or established by custom of people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.</p> <p>A codified system exists by which prospective applicable fishers apply for a licence, which is granted under consideration of the status of the target populations. No one is dependent on fishing for food; all fishing is commercial or recreational. One of the bases of the Management plan has been to establish a basis for licence allocation which provides a sustainable livelihood for those fishers with the clearest dependency on the fishery, while maintaining the stock and ecosystem status of the Lake within which the fishery operates.</p> |
| References | | Site visit, Nilsson et al 2010. | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | 100 |
| CONDITION NUMBER (if relevant): | | | |

Evaluation Table: PI 3.1.2

| PI 3.1.2 | | The management system has effective consultation processes that are open to interested and affected parties. The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties | |
|----------|-------|---|--|
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| 60 | a | Y | Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are generally understood . See 80 a) |
| | b | Y | The management system includes consultation processes that obtain relevant information from the main affected parties, including local knowledge, to inform the management system. See 80 b) |
| 80 | a | Y | Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for key areas of responsibility and interaction. Organisations and individuals involved in management have been identified – namely the County Boards and SUA. For key aspects of management, roles and responsibilities are well understood between these agencies. |
| | b | Y | The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information obtained. See 100 b) |
| | c | Y | The consultation process provides opportunity for all interested and affected parties to be involved. Consultation takes place widely with fishermen (see 100 b) and there is also contact with other stakeholder groups (e.g. anglers and environmental organisations), although not to the same extent as with the fishermen. |
| 100 | a | N | Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for all areas of responsibility and interaction. Roles and responsibilities have not been defined for all areas of potential interaction. |
| | b | Y | The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information and explains how it is used or not used . |

| PI 3.1.2 | | <p>The management system has effective consultation processes that are open to interested and affected parties.</p> <p>The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties</p> | |
|---|----------|--|---|
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| | | | Representatives from the SUA and the three counties surrounding the lake have regular discussions with the fishermen's organisation and also with individual fishermen (some are not members of the fishermen's organisation). Changes in the management are presented at meetings with the fishermen and properly announced in appropriate local media. Internal reviews are carried out within the three county boards and in the formation of joint management plans. Requests to county boards to issue licences must be approved by SUA. |
| | c | N | <p>The consultation process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement.</p> <p>While contact with other parties takes place, this is not to the same extent as with the fishing industry.</p> |
| References | | Site visit, Nilsson et al 2010. | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | 85 |
| CONDITION NUMBER (if relevant): | | | |

Evaluation Table: PI 3.1.3

| PI 3.1.3 | | The management policy has clear long-term objectives to guide decision-making that are consistent with MSC Principles and Criteria, and incorporates the precautionary approach | |
|---|-------|---|---|
| SG | Issue | Met? (Y/P/N) | Justification/Rationale |
| 60 | a | Y | Long-term objectives to guide decision-making, consistent with the MSC Principles and Criteria and the precautionary approach, are implicit within management policy See 80 a) |
| 80 | a | Y | Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach are explicit within management policy. The main objective of fisheries policy in Sweden is to promote sustainable and responsible management of fisheries. In its national strategy for sustainable development (2002) Sweden states that fisheries need to be put on a sustainable footing by applying the precautionary principle, adopting an ecosystem approach and securing biological diversity. Specifically, the long-term objective is to maintain a sustainable commercial fishery on the lake. Clear objectives to maintain a sustainable commercial fishery are therefore explicit within management policy. |
| 100 | a | N | Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are explicit within and required by management policy. No evidence was presented that objectives are required by management policy. |
| References | | Site visit, Nilsson, 2010. | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | 80 |
| CONDITION NUMBER (if relevant): | | | |

Evaluation Table: PI 3.1.4

| PI 3.1.4 | | The management system provides economic and social incentives for sustainable fishing and does not operate with subsidies that contribute to unsustainable fishing | |
|---|-------|--|--|
| SG | Issue | Met? (Y/P/N) | Justification/Rationale |
| 60 | a | Y | The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2. |
| | | | See 80 a) |
| 80 | a | Y | The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and seeks to ensure that perverse incentives do not arise. |
| | | | The pikeperch fishery went through a very bad period in the late 1990's, before the minimum landing size was increased to 45cm and gill nets modified accordingly. After these new rules were taken, the situation has very much improved. The tagging experiment of undersized pikeperch (Nyberg et al. 1996) that was done in cooperation with the fishermen, showed that undersized pikeperch have good chances of surviving if handled appropriately. The fishermen are very well aware of these facts and that they are gaining from the current management regime. The allocation of fishing licenses (entry to the fishery) is transparent and undertaken in an informed manner consistent with the promotion of a sustainable fishery. There are no subsidies or other mechanisms that would compromise the sustainability of the fishery. |
| 100 | a | N | The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and explicitly considers incentives in a regular review of management policy or procedures to ensure they not contribute to unsustainable fishing practices. |
| | | | There is no regular review of incentives within management policy. |
| References | | Site visit, Nyberg et al 1996, Bieir, U unpublished data, Nilsson et al 2010. | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | 80 |
| CONDITION NUMBER (if relevant): | | | |

Evaluation Table: PI 3.2.1

| PI 3.2.1 | | The fishery has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2 | |
|---|-------|---|---|
| SG | Issue | Met? (Y/P N) | Justification/Rationale |
| 60 | a | Y | Objectives , which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are implicit within the fishery's management system. |
| | | | See 80 a) |
| 80 | a | Y | Short and long-term objectives , which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery's management system. |
| | | | <p>The overarching objective is to maintain a sustainable commercial fishery in the lake. This objective is operationalised through a number of fishery control rules and tools as detailed in Section 3.3.5. Procedures exist to measure fishery parameters in relation to appropriate levels for each, particularly fishing effort, catch size distributions, recruitment and CPUE of commercial species. These are monitored on an ongoing basis and considered in relation to objectives for each.</p> <p>In particular, trophic effects are mitigated by an increased minimum size, allowing for a greater stock of larger pikeperch (a top predator in the system); the level of impact of the fishery is considered to be extremely low. Also, a closed area has been established (following a review of relevant scientific information) in a major spawning/nursery area in lake (Mellanfjarden) and this is enforced by County Board inspections.</p> |
| 100 | a | N | Well defined and measurable short and long-term objectives , which are demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery's management system. |
| | | | Objectives are reasonably well defined and monitoring is in place, but these are not demonstrably linked with achieving outcomes consistent with MSC Principles 1 and 2. |
| References | | Site visit, Bieir, U unpublished data, Nilsson et al 2010. | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | 80 |
| CONDITION NUMBER (if relevant): | | | |

Evaluation Table: PI 3.2.2

| PI 3.2.2 | | The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives | |
|----------|-------|--|---|
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| 60 | a | Y | There are some decision-making processes in place that result in measures and strategies to achieve the fishery-specific objectives. |
| | | | See 80 a) |
| | b | Y | Decision-making processes respond to serious issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take some account of the wider implications of decisions. |
| | | | See 80 b) |
| 80 | a | Y | There are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives. |
| | | | Procedures to limit harvest are established. Specifically all licence applications are reviewed in relation to fishery data and an opinion is expressed on whether or not the status of the fish populations is sufficient to tolerate a higher fishing pressure. Normally the license is valid for 3 or 5 years. Fishermen must also apply to the relevant county to be able to use gear above that normally permitted, for example, a fisherman has to have a permit to use trap nets, even if he owns the water area in which he fishes. |
| | | | Decision-making processes respond to serious and other important issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions. |
| | | | Decision-making processes are clearly linked to monitoring results. Pre-recruitment surveys allow for implementation of any necessary measures over appropriate timescales. Population levels necessary to maintain status are known implicitly. |
| | b | Y | Decision-making processes use the precautionary approach and are based on best available information. |
| | | | The best available information is used, and this is regularly updated through ongoing monitoring programmes; this information is used in a precautionary manner by decision-makers. |
| | c | Y | Decision-making processes use the precautionary approach and are based on best available information. |
| | | | The best available information is used, and this is regularly updated through ongoing monitoring programmes; this information is used in a precautionary manner by decision-makers. |
| | d | Y | Explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity. |
| | | | See 100 d) |
| 100 | b | N | Decision-making processes respond to all issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions. |
| | | | While decision making responds to serious issues, no evidence was presented that <u>all</u> relevant information was included in this process. |



| | | | |
|---|--------------|---|--|
| PI 3.2.2 | | The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives | |
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| | d | Y | <p>Formal reporting to all interested stakeholders describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.</p> <p>Explanations for decisions are presented to fishermen and to other stakeholders through regular meetings and other fora.</p> |
| References | | Site visit, Bieir, U unpublished data, Nilsson et al 2010. | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | 90 |
| CONDITION NUMBER (if relevant): | | | |

Evaluation Table: PI 3.2.3

| PI 3.2.3 | | Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with | |
|----------|-------|---|---|
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| 60 | a | Y | Monitoring, control and surveillance mechanisms exist are implemented in the fishery under assessment and there is a reasonable expectation that they are effective. See 80 a) |
| | b | Y | Sanctions to deal with non-compliance exist and there is some evidence that they are applied. See 80 b) |
| | c | Y | Fishers are generally thought to comply with the management system for the fishery under assessment, including, when required, providing information of importance to the effective management of the fishery. See 80 c) |
| 80 | a | Y | A monitoring, control and surveillance system has been implemented in the fishery under assessment and has demonstrated an ability to enforce relevant management measures, strategies and/or rules. Surveillance and enforcement is carried out by the County Boards, which have combined resources for a patrol vessel. They demonstrably control fishing activities by both commercial and recreational fishermen, although within private waters (closer than 300 from the shoreline) the limited amount of fishing effort is not subject to enforcement, but is monitored. Regular, unannounced, inspections are carried out by the county boards and scientists are closely involved with the monitoring of fishing activities. There is also effective self-policing by fishermen and merchants with strong social controls. |
| | b | Y | Sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence. Non-compliant gear can be confiscated, fines can be applied and licences removed or not renewed for repeat offences. These measures are agreed, tested and codified and are consistently applied. The nature of the fishery makes monitoring and control relatively straightforward. |
| | c | Y | Some evidence exists to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery. Fishermen's organisations, including most fishers, are fully informed of requirements. Any other changes in the management system are discussed with the fishermen through established procedures. Information and training is provided in the aims of the system and key factors such as care of undersize individuals to maximise survivorship. Fishermen are actively engaged in data collection and support the aims of management bodies, showing both knowledge and support of the aims of the management system. Awareness of management measures, and compliance with these, appears very good and provides sufficient information. |
| | d | Y | There is no evidence of systematic non-compliance. |

| PI 3.2.3 | | Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with | |
|--------------------------------------|-------|---|--|
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| | | | There is no evidence of non-compliance. |
| 100 | a | N | <p>A comprehensive monitoring, control and surveillance system has been implemented in the fishery under assessment and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.</p> <p>MCS is not comprehensive as private waters are not controlled.</p> |
| | b | N | <p>Sanctions to deal with non-compliance exist, are consistently applied and demonstrably provide effective deterrence.</p> <p>While sanctions to deal with non-compliance appear effective, their efficacy has not been demonstrated.</p> |
| | c | N | <p>There is a high degree of confidence that fishers comply with the management system under assessment, including, providing information of importance to the effective management of the fishery.</p> <p>Evidence does not support a high degree of confidence.</p> |
| References | | Site visit. | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | 80 |
| CONDITION NUMBER (if relevant): | | | |

Evaluation Table: PI 3.2.4

| PI 3.2.4 | | The fishery has a research plan that addresses the information needs of management | |
|------------|-------|--|---|
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| 60 | a | Y | Research is undertaken, as required, to achieve the objectives consistent with MSC's Principles 1 and 2. |
| | | | See 80 a) |
| | b | Y | Research results are available to interested parties. |
| | | | See 80 b) |
| 80 | a | Y | A research plan provides the management system with a strategic approach to research and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2. |
| | | | A research plan has been devised and implemented by SUA scientists, working closely with fishery managers and fishermen, providing a strategic approach to information gathering relevant to the management requirements of this fishery. This monitoring and research provides necessary information on the development of the fishery and measures of stock status and structure. This involves monitoring of catches, fishing intensity, CPUE, pikeperch recruitment and the fish community as a whole. These activities will be continued to also meet the requirements of the Water Framework Directive. These research activities are often undertaken together with fishermen and are complemented by other research in the lake, e.g. on overall productivity. Managers and scientists are aware of research undertaken by other institutions, and where relevant this is taken into account in the management of this fishery. Cooperative research with other lakes/organisations has been undertaken. With the transfer of laboratories of the National Board of Fisheries to the Swedish University of Agricultural Sciences, the interaction between the ongoing stock monitoring and general academic research in fisheries, fish ecology and general ecology will be strengthened even further. |
| | b | Y | Research results are disseminated to all interested parties in a timely fashion. |
| | | | Research results are disseminated to fishermen and other stakeholders at meetings, and also through websites and other publications. |
| 100 | a | N | A comprehensive research plan provides the management system with a coherent and strategic approach to research across P1, P2 and P3, and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2. |
| | | | It has not been demonstrated that the research plan is comprehensive |
| | b | N | Research plan and results are disseminated to all interested parties in a timely fashion and are widely and publicly available . |
| | | | While research results are widely disseminated, they do not all appear to be publicly available. |
| References | | | Site visit, https://www.havochvatten.se/en/start/about-us/publications.html . U.Beier, SUA, pers comm, 2011 |



| | |
|---|-----------|
| OVERALL PERFORMANCE INDICATOR SCORE: | 80 |
| CONDITION NUMBER (if relevant): | |

Evaluation Table: PI 3.2.5

| PI 3.2.5 | | There is a system of monitoring and evaluating the performance of the fishery-specific management system against its objectives There is effective and timely review of the fishery-specific management system | |
|--------------------------------------|-------|---|---|
| SG | Issue | Met? (Y/N) | Justification/Rationale |
| 60 | a | Y | The fishery has in place mechanisms to evaluate some parts of the management system. |
| | | | See 80 a) |
| | b | Y | The fishery-specific management system is subject to occasional internal review. |
| | | | See 80 b) |
| 80 | a | Y | The fishery has in place mechanisms to evaluate key parts of the management system |
| | | | Mechanisms exist for internal reviews of the success or otherwise of the management system between scientists, managers and fishermen. In particular, internal reviews are carried out within the three county boards and in the formation of joint management plans and SUA are currently investigating development of a stock assessment model for the pikeperch population. |
| | b | Y | The fishery-specific management system is subject to regular internal and occasional external review. |
| | | | Internal reviews of the management system are regularly undertaken by the County Boards, incorporating information from scientists. External reviews are also undertaken occasionally, the last in response to a condition of certification from the first MSC assessment of the fishery. This was undertaken by Bengt Sjostrand (a retired Senior Fisheries researcher who still sits on the panel of KRAV), Bengt completed the review in 2009. |
| 100 | a | N | The fishery has in place mechanisms to evaluate all parts of the management system. |
| | | | |
| | b | N | The fishery-specific management system is subject to regular internal and external review. |
| | | | |
| References | | Site visit, U.Beier, SUA, pers comm, 2011, Nilsson et al 2010. | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | 80 |
| CONDITION NUMBER (if relevant): | | | |



Appendix 1.2 Risk Based Framework (RBF) Outputs
(REQUIRED FOR ALL REPORTS WHERE THE RBF HAS BEEN USED)

Appendix 1.2.1 Scale Intensity Consequence Analysis (SICA)

Table 1.2.1.a: Principle 1 SICA Scoring Template Target Species

| Performance Indicator | Risk-causing activities | Spatial scale of activity | Temporal scale of activity | Intensity of activity | Relevant subcomponents | Consequence score | MSC Score |
|---|---|---------------------------|----------------------------|-----------------------|-------------------------------|-------------------|-----------|
| Target species outcome <i>Pikeperch in Lake Hjalmaren</i> | Fishing activities from all fisheries including: <ul style="list-style-type: none"> • Direct capture • Unobserved mortality (e.g. gear loss) • Capture as bycatch in other fisheries • Other identified risk-causing activities (please specify) | 2 | 6 | 3 | Population size | | |
| | | | | | Reproductive capacity | | |
| | | | | | Age/size/sex structure | 3 | 60-80 |
| | | | | | Geographic range | | |
| Rationale: | <p>As described in Section 3.3.3 of the report, there are no formal reference points established for pikeperch, although fishery-independent indices indicate a healthy stock. To confirm this, the RBF was used for PI 1.1.1.</p> <p>The greatest risk-causing activity was direct capture in the fishery, there being no other major sources of fishery-related mortality. The assessment here was based on combined mortality from the fish-trap and gill-net fishery.</p> <p>On the basis of the current level of fishing, there are around 200 fish traps distributed around the lake, and 20 gill-netters, each using around 1000m of net. If all gear were deployed at a given time, the total area covered by fishing gear would be less than a few km²; the lake is 485km², The Spatial scale of the fishery is therefore taken to be 1-15% of the total area; the best guess of stakeholders was 1-2% of the total area fished in winter, 5% in summer (2).</p> <p>Some fishing activity takes place on most days; the temporal scale was therefore taken as 300-365 days per year (6).</p> | | | | | | |



| | |
|--|--|
| | <p>Where fishing takes place, fishing activity (intensity) will be obvious, but localised; there will be large areas of the lake with no detectable fishing or fishing-related effects. Intensity is therefore moderate (3). Stakeholders were undecided as to which subcomponent of the population (either population size or population structure age/size), would be most affected by fishing; most large fish are captured but the recruitment to the population has been consistent.</p> <p>The stakeholders and assessment team, having identified the subcomponent representing the 'worst-case' situation, discussed the likely consequence in relation to the relevant consequence categories until a consequence score was unanimously agreed. The consequence score was agreed to be closest to 3 for age/size /sex structure. As the consequence score was under 80, a Productivity-Sensitivity Analysis (PSA) was carried out to determine the MSC score.</p> |
|--|--|

Table 1.2.1.b SICA Scoring Template for PI 2.1.1 Retained Species

| Performance Indicator | Risk-causing activities from fishery under assessment | Spatial scale of activity | Temporal scale of activity | Intensity of activities | Relevant subcomponents | Consequence score | MSC Score |
|--|--|---------------------------|----------------------------|-------------------------|---------------------------------------|-------------------|-----------|
| PRINCIPLE TWO: Retained Species Outcome | <ul style="list-style-type: none"> Fishing Gear loss Bait collection Other identified risk-causing activities (please specify) | 2 | 6 | 3 | Population size - bream | 2 | 80 |
| | | | | | Reproductive capacity - burbot | 2 | 80 |
| | | | | | Age/size/sex structure | | |
| | | | | | Geographic range | | |
| Species: | | | | | | | |
| <i>Fish trap – bream</i> | | | | | | | |
| <i>Gill-net - burbot</i> | | | | | | | |
| Rationale: | <p>The most vulnerable species taken in the fish traps was considered to be bream (around 200 t landed as opposed to around 100 t of perch, the next most vulnerable species), its morphology meaning it is caught in traps at a length at which perch would escape, meaning relatively high selectivity. In the gill-net burbot was considered most vulnerable as it is slow-growing and late maturing. The greatest risk-causing activity for both species was direct capture in the fishery, there being no other major sources of fishery-related mortality.</p> <p>On the basis of the current level of fishing, there are around 200 fish traps distributed around the lake, and 20 gill-netters, each using around 1000m of net. If all gear were deployed at a given time, the total area covered by fishing gear would be less than a few km²; the lake is 485km², The Spatial scale of the fishery for both gear types is therefore taken to be 1-15% of the total area (2).</p> <p>Some fishing activity takes place on most days; the temporal scale was therefore taken as 300-365 days per year (6).</p> <p>Where fishing takes place, fishing activity (intensity) will be obvious, but localised; there will be large areas of the lake with no detectable fishing or fishing-related effects. Intensity is therefore moderate (3).</p> <p>For bream in fish traps, population size was considered the most likely-affected subcomponent of the population. For burbot in gill-nets, given their large size and slow maturation, reproductive capacity was considered the most affected subcomponent.</p> <p>The stakeholders and assessment team, having identified the subcomponent representing the ‘worst-case’ situation, discussed the likely consequence in relation to the relevant consequence categories until a consequence score was unanimously agreed.</p> <p>For both species, a Consequence of 2 was allocated – possibly detected change but with minimal effects on population dynamics.</p> | | | | | | |

Table 1.2.1.c Scoring Template for PI 2.2.1 Bycatch Species (Reference: CR Table CC5, GCR Pg 107)

| Performance Indicator | Risk-causing activities from fishery under assessment | Spatial scale of activity | Temporal scale of activity | Intensity of activities | Relevant subcomponents | Consequence score | MSC Score |
|---|--|---------------------------|----------------------------|-------------------------|------------------------|-------------------|-----------|
| PRINCIPLE TWO: Bycatch Species Outcome Species: <i>Fish trap – ruff</i> <i>Gill-net - none</i> | <ul style="list-style-type: none"> Fishing Gear loss Bait collection Other identified risk-causing activities (please specify) | 2 | 6 | 3 | <u>Population size</u> | 1 | 100 |
| | | | | | Reproductive capacity | | |
| | | | | | Age/size/sex structure | | |
| | | | | | Geographic range | | |
| Rationale: | <p>There are no by-catch (discarded) species in the gill-net fishery. In the fish trap, few species are not retained at all, the most commonly caught of these is ruff (difficult to handle and of no commercial value as bait). The greatest risk-causing activity was direct capture in the fishery, there being no other major sources of fishery-related mortality. On the basis of the current level of fishing, there are around 200 fish traps distributed around the lake. If all gear were deployed at a given time, the total area covered by fishing gear would be less than a few km²; the lake is 485km², The Spatial scale of the fishery for both gear types is therefore taken to be 1-15% of the total area (2). Some fishing activity takes place on most days; the temporal scale was therefore taken as 300-365 days per year (6). Where fishing takes place, fishing activity (intensity) will be obvious, but localised; there will be large areas of the lake with no detectable fishing or fishing-related effects. Intensity is therefore moderate (3). For ruff in fish traps, population size was considered the most likely-affected subcomponent of the population. The stakeholders and assessment team, having identified the subcomponent representing the ‘worst-case’ situation, discussed the likely consequence in relation to the relevant consequence categories until a consequence score was unanimously agreed. A consequence score of 1 was allocated, fishing effects unlikely to be detectable against background variation.</p> | | | | | | |

Table 1.2.1.d Scoring Template for PI 2.4.1 Habitats

| Performance Indicator | Risk-causing activities from fishery under assessment | Spatial scale of activity | Temporal scale of activity | Intensity of activities | Relevant subcomponents | Consequence score | MSC Score |
|---|---|---------------------------|----------------------------|-------------------------|---------------------------------------|-------------------|-----------|
| PRINCIPLE TWO: Habitats Outcome | <ul style="list-style-type: none"> • Fishing • Gear loss • Bait collection • Anchoring/mooring • Other identified risk-causing activities (please specify) | 2 | 6 | 3 | Habitat types | | |
| Habitat: | | | | | | | |
| Fish trap: Sand and muddy-sand Gill-net: pelagic | | | | | <u>Habitat structure and function</u> | 1 | 100 |
| Rationale: | <p>Little specific study has been carried out on the effects of the fishery on habitats; due to its expected minimal effect. Hence the RBF is used for this PI.</p> <p>The gill-net fishery is entirely pelagic with no benthic habitat interactions.</p> <p>The greatest risk-causing activity is the placement of fish traps on the lake bed. The habitat likely to be affected is sand and muddy sand, where the traps are preferentially located.</p> <p>On the basis of the current level of fishing, there are around 200 fish traps distributed around the lake. If all gear were deployed at a given time, the total area covered by fishing gear would be less than a few km²; the lake is 485km², The Spatial scale of the fishery for both gear types is therefore taken to be 1-15% of the total area (2).</p> <p>Some fishing activity takes place on most days; the temporal scale was therefore taken as 300-365 days per year (6).</p> <p>Where fishing takes place, fishing activity (intensity) will be obvious, but localised; there will be large areas of the lake with no detectable fishing or fishing-related effects. Intensity is therefore moderate (3).</p> <p>Habitat type would not be affected, but the structure and function of the habitat could be. The agreed consequence score, however, was 1 – no detectable change to the internal dynamics of habitat or populations of species making up the habitat. The same consequence was recorded for gill-nets in the pelagic habitat.</p> | | | | | | |

Table 1.2.1.e Scoring Template for PI 2.5.1 Ecosystem

| Performance Indicator | Risk-causing activities from fishery under assessment | Spatial scale of activity | Temporal scale of activity | Intensity of activities | Relevant subcomponents | Consequence score | MSC Score |
|---|--|---------------------------|----------------------------|-------------------------|--------------------------------------|-------------------|-----------|
| PRINCIPLE TWO: Ecosystem Outcome | <ul style="list-style-type: none"> • Fishing • Gear loss • Bait collection • Other identified risk-causing activities (please specify) | 2 | 6 | 3 | Species composition | | |
| With reference to the effects of removal of top predators from the lake system | | | | | Functional group composition | | |
| | | | | | Distribution of the community | | |
| | | | | | <u>Trophic size/structure</u> | 2 | 80 |
| Rationale: | <p>Little specific study has been carried out on the effects of the fishery on ecosystem function in Lake Hjalmarren, hence the RBF is used for this PI.</p> <p>The greatest risk-causing activity is considered to be the removal of top predators from the lake system through direct capture.</p> <p>On the basis of the current level of fishing, there are around 200 fish traps distributed around the lake, and 20 gill-nets, each using around 1000 m of net. If all gear were deployed at a given time, the total area covered by fishing gear would be less than a few km²; the lake is 485 km², The Spatial scale of the fishery for both gear types is therefore taken to be 1-15% of the total area (2).</p> <p>Some fishing activity takes place on most days; the temporal scale was therefore taken as 300-365 days per year (6).</p> <p>Where fishing takes place, fishing activity (intensity) will be obvious, but localised; there will be large areas of the lake with no</p> | | | | | | |



| | |
|--|--|
| | <p>detectable fishing or fishing-related effects. Intensity is therefore moderate (3). The 'subcomponent' of the lake ecosystem considered most likely to be affected by the fishery is trophic size/structure – due to the removal of top predators, principally pikeperch, from the lake system. The stakeholders and assessment team, having identified the subcomponent representing the 'worst-case' situation, discussed the likely consequence in relation to the relevant consequence categories until a consequence score was unanimously agreed. The agreed consequence score was 2 – change in mean trophic level/biomass/number in each size class up to 5% and time to recover from impact typically up to 5 years.</p> |
|--|--|



Appendix 1.2.2 Productivity-Susceptibility Analysis (PSA)

The RBF was used for PI 1.1.1 to evaluate the risk of the fishery to pikeperch populations. The PSA worksheet and supporting rationale are given below.

| COMMON_NAME | Average age at maturity | Average max age | Fecundity | Average max size | Average size at Maturity | Reproductive strategy | Trophic level (fishbase) | Total Productivity (average) | Availability | Encounterability | Selectivity | Post-capture mortality | Total (multiplicative) | Color on PSA plot | PSA Score | MSC Score | Risk Category Name | MSC scoring guidepost |
|-------------|-------------------------|-----------------|-----------|------------------|--------------------------|-----------------------|--------------------------|------------------------------|--------------|------------------|-------------|------------------------|------------------------|-------------------|-----------|-----------|--------------------|-----------------------|
| fish-trap | 1 | 2 | 1 | 1 | 1 | 2 | 3 | 1.57 | 1 | 3 | 3 | 3 | 1.65 | | 2.28 | 89.7 | Low | >80 |
| gill net | 1 | 2 | 1 | 1 | 1 | 2 | 3 | 1.57 | 1 | 3 | 3 | 3 | 1.65 | | 2.28 | 89.7 | Low | >80 |

Table 1.2.2.a PSA Principle 1 Rationale Table

| PI number | 1.1.1 | |
|---------------------------------|--|--|
| Productivity | Rationale | |
| Average age at maturity. | Average age at maturity is 4 years | |
| Average maximum age | Maximum reported age is 17 years | |
| Fecundity | Fecundity is high (around 100,000 eggs per year) | |
| Average maximum size | Maximum length is up to 100 cm | |
| Average size at maturity | Mean size at maturity is 36.7 cm | |
| Reproductive strategy | Demersal egg layer | |
| Trophic level | Pikeperch is a top predator | |
| Fishery | Gill-Net | |
| Susceptibility | Rationale | |
| Areal Overlap | 1-2% | |
| Vertical Overlap | Gill-nets are positioned to catch pikeperch through much of the water column in deeper water. Overlap is expected to be high. | |
| Selectivity | Length at maturity is 36.7 cm versus a mesh size of 12 cm stretched mesh, more than twice the mesh size. | |
| Post capture mortality | Pikeperch is the target species. | |
| Fishery | Fish-Trap | |
| Susceptibility | Rationale | |
| Areal Overlap | 5% | |
| Vertical Overlap | Leaders on the fish trap are positioned to catch pikeperch in shallower water throughout the water column. Overlap is expected to be high. | |
| Selectivity | Length at maturity is 36.7 cm versus a mesh size of less than 12 cm, more than twice the mesh size. | |

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| | | |
|-------------------------------|----------------------------------|----------|
| Post capture mortality | Pikeperch is the target species. | 3 |
|-------------------------------|----------------------------------|----------|

The average percentage distribution of catches between gill-net and fish-trap between 1996-2011 was approximately 43% in traps and 57% in gill nets, However, the PSA score is the same for both gears and so the weighted average score remains 89.7, rounded to 90.



Appendix 1.3 Conditions

Two conditions were raised in this re-assessment. The first relates to stock status and is triggered because the SICA score for PI 1.1.1 was below 80. The PSA score was 90 (based on the same rationale as the original assessment) but a SICA score <80 prevents the RBF being used at re-assessment.

The second relates to harvest control rules and tools. As this is the first assessment of this fishery against the MSC standard assessment tree, this is the first time this fishery has been evaluated against a PI phrased in this way.

Table A1.3: Condition 1

| Performance Indicator | PI 1.1.1. The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing |
|------------------------------|---|
| Score | This PI was scored using the RBF. The PSA score was 90, but the SICA score was <80. Accordingly a condition must be raised against this PI (CR CC 3.1.3) |
| Rationale | A condition must be raised against this PI according to MSC CR CC 3.1.3 |
| Condition | There must be information collected and analysed providing a direct measure of stock status (e.g. biomass) that can be compared with biologically-based reference points by the time of the re-assessment. |
| Milestones | <p>Within the first year of certification, a plan to address the requirements of this condition should be in place.</p> <p>Within the second year of certification, work should have begun to determine stock status.</p> <p>Within the third year of certification, work on the above should continue.</p> <p>Within the fourth year of certification, there should be a direct measure of stock status and appropriate reference points in place. (Score 80)</p> |
| Client action plan | <p>Client action plan regarding condition 1.1.1</p> <p>Within the first year of certification</p> <p>Client should coordinate relevant authorities and stakeholders to produce and set in place a Biomass data collection plan for the here called "limited reference points for SSB" including a plan on how to collect and analyse information providing a direct measure of stock status (e.g. biomass) that may be compared with biologically-based reference points by the time of the re-assessment.</p> <p>Client and relevant authorities will ensure that desired management data, here called "limit and target reference points for SSB" and their content definition is reviewed by the CAB to ensure the condition is on target for satisfactory completion.</p> <p>Within year 2</p> <p>Client coordinates and secures that government authorities work on determining stock status "limited reference points for SSB" as defined in Biomass data collection plan, has begun.</p> <p>Within year three</p> <p>Client should coordinate and secure that work within the Biomass data collection plan continues.</p> <p>Within year four</p> <p>Client should be able to harvest the result of work under Biomass data collection</p> |

| | |
|----------------------------------|--|
| | plan and relevant authorities should be able to present the direct measures of stock status and appropriate reference points, here called "limited reference points for SSB" and present that said points are set in place in management of the fishery. |
| Consultation on condition | Client has consulted stakeholders and relevant authorities such as Havs- och vatten myndigheten, SLU Aqua and Länsstyrelsen in Örebro län (Regional board of council) and has secured the necessary long term data provisions. |

Table A1.3: Condition 2

| | |
|------------------------------|---|
| Performance Indicator | PI 1.2.2. There are well defined and effective harvest control rules in place |
| Score | 75 |
| Rationale | No evidence was presented of well-defined harvest control rules in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached. The management rules are well understood, but do not clearly define the sequencing of actions that would be undertaken should the risk of overfishing arise. The rules are therefore not considered to be well defined. |
| Condition | Well defined harvest control rules shall be put in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached. Reference points shall be as determined under Condition 1. |
| Milestones | <p>Actions within the first year of certification will be under Condition 1. (Score 75)</p> <p>Within the second year of certification, a plan for producing harvest control rules shall be produced. (75)</p> <p>Within the third year of certification, work on the above should continue. (75)</p> <p>Within the fourth year of certification, there should be harvest control rules in place which ensure that the exploitation rate is reduced as limit reference points are approached. (Score 80)</p> |
| Client action plan | <p>Actions within the first year of certification will be under Condition 1. (Score 75)</p> <p>Within the second year of certification, a plan for producing harvest control rules shall be produced. (75)</p> <p>Within the third year of certification, work on the above should continue. (75)</p> <p>Within the fourth year of certification, there should be harvest control rules in place which ensure that the exploitation rate is reduced as limit reference points are approached. (Score 80)</p> <p>Client Action plan regarding condition 1.2.2</p> <p>Within the first year of certification</p> <p>Client is required to coordinate relevant government authorities and stakeholders to create an agreement (MoA) on securing the desired management data in a long term perspective. The agreement should include responsibility of relevant stakeholders to continue to manage fisheries in a sustainable manner.</p> <p>The desired management data, here called "well-defined harvest control regulations" (with respect to the reference points) and their content definition will be reviewed by the CAB to ensure the condition is on target for satisfactory completion.</p> <p>Within year 2</p> <p>Client is required to coordinate a plan for producing harvest control rules including relevant stakeholders and authorities in the process.</p> |

| | |
|---|--|
| | <p>Within year 3 Client is required to secure that work on the plan for producing harvest control rules continue by coordinating relevant authorities and stakeholder input.</p> <p>Within year four Client, relevant authorities and stakeholders should, with the force of the MoA from year one, secure and present that said harvest control rules ("well-defined harvest control regulations") are implemented in the fishery, ensuring the exploitation rate is reduced if limit reference points are approached.</p> <p>Before year five The implemented management data, here called "well-defined harvest control regulations", provide background to the process of re-certification in year five, when next recertification cycle starts.</p> |
| <p>Consultation on condition</p> | <p>Client has consulted stakeholders and relevant authorities such as Havs- och vatten myndigheten, SLU Aqua and Länsstyrelsen in Örebro län (Regional board of council) and has secured the necessary long term data provisions.</p> |



Peer Review A

Overall Opinion

| | | |
|---|-----|---|
| Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report? | Yes | Conformity Assessment Body Response |
| <p><u>Justification:</u></p> <p><i>Re-certification of the fishery appears to be appropriate on the basis that the fishery is well established has been previously certified, and RBF assessment of the fishery suggests it is likely to be sustainable.</i></p> <p><i>However, as will be seen from the comments below, the presentation of the evidence in the report requires attention to provide adequate support to the assessment outcome and the conclusions drawn for many Performance Indicators.</i></p> | | <p>We agree with the overall conclusion. Additional evidence and references have been added throughout the report as described below.</p> |

| | | |
|---|-----|--|
| Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe? | Yes | Conformity Assessment Body Response |
| <p><u>Justification:</u></p> <p><i>The conditions match the narrative and metric form of the relevant PIs.</i></p> | | |

If included:

| | | |
|--|----|---|
| Do you think the client action plan is sufficient to close the conditions raised? | No | Conformity Assessment Body Response |
| <p><u>Justification:</u></p> <p><i>The client action plan contains no information to indicate that the other entities that will be engaged in delivery of the client action plan have agreed to commit the time and resources necessary to deliver this plan (CR §27.11.3 refers).</i></p> | | <p>The CAP has been further developed by the client group, and updated in the report.</p> |

General Comments on the Assessment Report (optional)

This fishery is undergoing re-assessment. This assessment report presents a more comprehensive view of the fishery than the original report from 2006. It appears that the issues that led to conditions of certification have now received attention, and that there has been progress in the management of the fishery.



Unit(s) of Certification

The original 2006 assessment considered just the gill net fishery. This re-assessment considers both the winter gill net fishery and also the summer fish-trap fishery.

It is clear, particularly from the description of the fishing methods and the SICA assessment, that the fishing methods are quite different and have different potential impacts on the various aspects of P2. It appears that the report could be usefully restructured on the basis of two units of certification – the assessment outcome would be unchanged, but this would seem to fit better with MSC Scheme requirements.

IMM Comment: The original assessment was also for gill-net and fish-trap fisheries. The performance of both fisheries has been virtually identical, but for the sake of complete clarity, scoring has been shown for each unit of certification.

Document housekeeping

The report presented for peer review is clearly a draft, and I expect that it will be “polished” prior to publication. Notable omissions in this draft included:-

- Index / table of contents
- Glossary of terms & acronyms used in the report
- Legends for figures
- List of references / reports / publications / websites cited as evidence in the report.

I have no doubt that the authors will address these omissions before publication; it would be remiss not to mention them however.

There are of course a number of spelling mistakes in the report. I have annotated those I have spotted in the PDF for the team’s attention, but have not listed these in the comments below.

Narrative text

This part of the report provides an opportunity to provide an overview of the fishery, relevant science, and the management system. The current draft covers all of these areas, but does not provide adequate reference to authorities (such as reports / papers / websites) to allow the reader to verify the statements in the text or to establish the team’s basis for drawing certain conclusions in the text and subsequently in the relevant Performance Indicators.

IMM: Additional references have been added throughout.

All Performance Indicators: References

The “References” section for every Performance Indicator is limited to a reference to the “Site Visit” or “Appendix 1.2”. It would be very helpful to see references to the reports and publications that the team have drawn upon to inform their conclusions. The absence of this information, along with any record of the discussions at the site visit, makes it very hard to evaluate whether appropriate scores have been awarded.

IMM: Additional references have been added throughout.

Evidence base

The presentation of evidence in the current draft of the report is not adequate to provide robust and comprehensive support to the team’s conclusions.

Cormorant Cull

The report mentions at §3.4.4 that there is an annual cormorant cull of 2000 birds because the population is considered “*too large*”. It would be helpful to know whether this cull is connected with the management of the Pikeperch fishery. If it is, that would have significant implications for the assessment outcome.

IMM: it is not, as detailed below.

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Summary

Whilst having no reason to argue with the overall outcome of this assessment report, additional work needs to be done on the current draft to set out the evidence base to support the assessment outcome.



Performance Indicator Review

Please complete the table below for each Performance Indicator which are listed in the Conformity Assessment Body's Public Certification Draft Report.

| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
|-----------------------|--|--|---|--|--|
| 1.1.1 | Yes | Yes | NA | Scored using RBF – see comments in relevant section below. | |
| 1.1.2 | Yes | Yes | NA | Not scored – RBF used for fishery. | |
| 1.1.3 | NA | NA | NA | Fishery not considered to be depleted on basis of PI 1.1.1 scoring. | |
| 1.2.1 | Yes | No | NA | Reference is made to documents that are not cited or quoted in the report in sufficient detail to allow verification of the scoring. At SG80(a) reference is made to an “overriding objective” for the fishery, but there is no evidence where this is written down, or has been agreed by the various different management entities around the Lake. SG80(b) refers to monitoring work, but there | Additional supporting evidence and references have been added to the report and scoring comments. This is provided in Nilsson et al (2010). Additional text has been added detailing |



| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
|-----------------------|--|--|---|---|--|
| | | | | <p>is no evidence in this report of outputs from this monitoring work that would confirm that the management objectives are being met.</p> <p>If this evidence is provided and referenced in the report, then the score would be justified.</p> | <p>monitoring and outputs.</p> <p>Confirmed.</p> |
| 1.2.2 | No | No | NA | <p>Comments of a similar nature to those above: there is insufficient reference to publications and authorities to confirm that the scoring outcome is justified.</p> <p>At SG60(a), the later scoring of PI3.2.5 suggests that management of the fishery might not be as well integrated as suggested here, calling the scoring of this SG into doubt. There needs to be some evidence of a formal integrated approach to management, and this is not presented in the report.</p> <p>At SG80(b) it is stated that "various indices" are used to monitor the stock. What are they? It would be appropriate to list what the main</p> | <p>Additional supporting evidence and references have been added to the report and scoring comments.</p> <p>PI 3.2.5 scored a comfortable 80. Management is sufficient to address fluctuations in pikeperch populations, and the conditions in place are expected to further strengthen this aspect of management.</p> <p>Indices, and uncertainties are detailed in the report and so have not been duplicated here; basically these are provided through the test fishing programme which measures</p> |



| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
|-----------------------|--|--|---|---|--|
| | | | | <p>uncertainties are and how they are taken into account.</p> <p>At SG80(c) it is stated that there is evidence of the strength of the stock – no evidence of stock status is presented in the current draft of the report, only landings data.</p> | <p>population structure, numbers and distributions. This is supplemented by catch data, recruitment indices and hydroacoustic survey.</p> <p>Further data is provided from the indices above.</p> |
| 1.2.3 | Yes | No | NA | <p>At SG80(a) and (b) there is insufficient evidence set out in the scoring rationale or elsewhere in the report to justify the score awarded.</p> <p>At SG80(c) it is reported that recreational catches are not recorded; this being the case there cannot be “good information” on all other fishery removals.</p> <p>At SG80(c) no information is presented in the report to describe the nature and extent of discards (of the target species) from any other fishing activity in the lake, so the scoring rationale on this issue cannot be verified.</p> | <p>See response above – additional information has been provided.</p> <p>The rest of the sentence goes on to explain how the significance of recreational catches can be determined by the ongoing surveillance across the lake. Additional information has been added to the report.</p> <p>Further information has been provided in the report on discarding and survivorship. The main other commercial fishing activity in the lake is a crayfish fishery which has a minimal pikeperch bycatch.</p> |



| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
|-----------------------|--|--|---|---|---|
| 1.2.4 | Yes | Yes | NA | Default score of 80 awarded because RBF used to score PI1.1.1 | |
| | | | | | |
| 2.1.1 | Yes | Yes | NA | RBF used to score this PI. | |
| 2.1.2 | Yes | No | NA | <p>At SG80(a) The scoring rationale does not adequately explain why the strategy for managing the pikeperch fishery is an effective partial strategy for maintaining bycatch species at appropriate levels. Appendix 1.2 indicates that around 200t of bream and 100t of perch are retained. Are there MLS for these species? How does the size at capture relate to size at spawning? Are there any CPUE data to show that the stocks are stable?</p> <p>At SG80(b) the assertion that the health of the target species stock is evidence that non-target species will also be in good condition is novel. Better justification than this is needed.</p> | <p>Additional text has been added to the report and explanation in the scoring comments.</p> <p>The test fishing programme has demonstrated stability in retained and bycatch populations. Also the fact that the strategy for managing target species is based on effort limitation and good handling of catches – and survivorship of fish returned</p> |



| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
|-----------------------|--|--|---|---|---|
| | | | | <p>At SG80(b) it is stated that “<i>the test fishing programme will determine any significant deterioration in the health of retained species populations</i>” (my emphasis). If this is the case, it appears that this programme will take place at some time in the future, and thus does not yet provide objective evidence. If this interpretation is incorrect, then the evidence should be presented here.</p> <p>At SG80(c) the rationale is only valid if the argument under SG80(a) is strengthened to provide convincing evidence that there is in fact a partial strategy in place for the non-target species.</p> | to the lake. The test fishing is, of course, an ongoing programme. |
| 2.1.3 | No | No | NA | <p>The scoring rationale refers to information that is neither reproduced in the report nor included as a list of documentary evidence that supports the scoring. It is therefore impossible to determine whether or not the information exists, or what it shows.</p> <p>At SG80(d) evidence is required to show that this programme is adequate in scope and</p> | As outlined under Principle 1, additional detail of the monitoring programmes has been included in the report, and additional citations provided. |



| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
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| | | | | <p>extent to provide this information; showing some of the results of the monitoring in the report would boost confidence in the scoring.</p> <p>SG100(a) refers to information that is not presented in the report or adequately cited, so scoring at this level cannot be supported.</p> <p>SG100(c) states that "<i>Should the need be identified, it is expected that the information collection would be sufficient to support a suitable strategy for the management of retained species.</i>" This rationale is too speculative so support a score at this level, and requires further substantiation or a revision of the score.</p> | <p>Asabove.</p> <p>The text was worded thus as the need for a comprehensive strategy has not been demonstrated; nevertheless, the existing monitoring is sufficient to support development of a strategy if required, and to evaluate its effectiveness.</p> |
| | | | | | |
| 2.2.1 | Yes | Yes | NA | The RBF was used to score this PI. | |
| 2.2.2 | No | No | NA | The scoring rationale set out here is identical to that for PI 2.1.2. The comments are | See response to 2.1.2 |



| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
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| | | | | <p>accordingly identical.</p> <p>In summary, there is insufficient verifiable information presented in the report to support the score awarded.</p> | |
| 2.2.3 | No | No | NA | <p>The scoring rationales are not supported with sufficient evidence to justify the score. Specifically:-</p> <p>SG100(a) – if there is accurate and verifiable information available, then where is it?</p> <p>SG100(a) states that there are “no discarded species in the gill net or trap fisheries” yet at PI2.2.1 100(a) it is stated that there are discards from the trap fishery and these are detailed in Appendix 1.2.</p> <p>SG100(a) the assertion that test fishing in just one part of the lake provides information about the status of the fish community throughout the lake is novel and requires justification.</p> | <p>The test-fishing programme provides such information.</p> <p>This is corrected – there are no discarded by-catch species in the gill-net fishery and extremely few (the most common being ruff) in the fish-trap fishery. This is further detailed in Appendix 1.2.</p> <p>Accurate and verifiable information is available on the amount of bycatch, the main point of SG100 (a); test fishing will show any major changes in lake populations.</p> |



| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
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| | | | | <p>SG100(c) refers to the “<i>demonstrably excellent survivorship</i>” of discards of non target fish. Where is the evidence of this?</p> <p>SG100(c) – the rationale is not directly relevant to the metric and narrative of the SG, and does not support the score.</p> <p>SG100(d) – the rationale set out here and the information elsewhere in the report do not provide any evidence of the existence of bycatch data that would assess ongoing mortality of any species, let alone “<i>all species</i>” (my emphasis), as required by the SG. Scoring at this level is not supported, certainly not if the team adopt an approach consistent with their scoring of PI2.3.3 at SG100(b) (see below).</p> | <p>Nyberg et al 1996 as referenced now.</p> <p>As bycatch is minimal, measures to maximise survival of fish returned to the lake will provide as comprehensive a management strategy as could be required.</p> <p>Monitoring is sufficient to evaluate all bycatch species and is expected to continue to do so, based on current levels of surveillance. This is sufficient to detect any future changes in bycatches.</p> |
| 2.3.1 | No | Yes | NA | At SG100(a) it would be appropriate to cite the monitoring data that support the scoring rationale (5 cormorants pa caught in the fishery). | <p>Monitoring has been undertaken in response to a condition raised in the initial certification, references added.</p> <p>Cormorants are not culled in response to the</p> |



| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
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| | | | | <p>In the narrative of the report (at §3.4.4) indicates that there is an annual cull of 2000 cormorants on the Lake because their population is "too large". It would be useful to clarify whether the cormorants are culled for any reason connected with the Pikeperch fishery (such as predation on Pikeperch juveniles or competition with mature fish).</p> | <p>specific Lake Hjalmarén fishery, but as part of a wider governmental programme.</p> |
| 2.3.2 | No | Yes | NA | <p>At SG80(a) it would seem appropriate to include information about the intrinsic nature of the fishery which makes interactions with ETP species unlikely.</p> <p>SG80(b) it would be helpful to summarise the results of monitoring from the previous period of certification; it would also be helpful to clarify that this monitoring is still in place.</p> <p>From the information presented in the report, it seems quite likely that the SG100(c) and (d) standards are met, and arguably SG100(b).</p> <p>Overall, a higher score for this PI would</p> | <p>Text added</p> <p>Text in main body of report. Overall monitoring of the lake ecosystem continues.</p> <p>No evidence was provided that strategies are <u>comprehensive</u>.</p> |



| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
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| | | | | seem to be warranted. | |
| 2.3.3 | No | Yes | NA | <p>Again, it would seem that a higher score might be justified if the results of monitoring of interactions with ETP species from the current period of certification are used.</p> <p>Even if this is not the case, then better use of this information in the scoring rationales would provide more support for the score awarded.</p> | The team do not feel a higher score to be warranted – there being no systematic evaluation of <u>all</u> potential impacts. |
| 2.4.1 | Yes | Yes | NA | RBF used to score this PI. | |
| 2.4.2 | No | Yes | NA | <p>The scoring comments do not take account of the Natura 2000 network or domestic habitat protection strategies. If taken into account, these strategies would provide further support to the scores awarded and could support a higher score.</p> <p>Part of the lake is a Natura 2000 site, this is</p> | Additional text has been added - in the westernmost part of the lake, there is a small 'Natura 2000' area. This is a very shallow area where none of the currently evaluated fishing activities takes place and there are consequently no conflicts in this respect. |



| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
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| | | | | <p>not mentioned here or anywhere else in the report. This is relevant, and could benefit the scoring of this PI.</p> <p>SG80(a) contains a typographic error. "SG100" presumably should read "SG80".</p> | Corrected |
| 2.4.3 | No | No | NA | <p>Again, the report does not contain the information or references to other sources which would support the scores awarded.</p> <p>At SG80(a) and (b) the rationale states that there are maps of the distribution of vulnerable habitats and the location of fishing activities which enables the impact of the fishery to be understood. No maps are presented here or anywhere else in the report to support this assertion; without the information these scores are not supported.</p> | The report does not state this. It states that habitats are well known (which was established during the site visits) and that fishing locations are well known and monitored. This has all been verified over this and the previous assessment and comfortably supports a score of 80. Additional references have been added. |
| | | | | | |



| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
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| 2.5.1 | Yes | Yes | NA | RBF has been used to score this PI | |
| 2.5.2 | No | No | NA | <p>The nature of the partial strategy should be described here – it presumably comprises of the various measures and strategies in place to managing impacts on the other P2 components, which could usefully be summarised here.</p> <p>SG80(b) states that “<i>information on ecosystem components [...] are all considered in the management of the pikeperch and other fisheries</i>”. How? There is no evidence in the report to show that the impact of the fishery on any of the other ecosystem components governs how the pikeperch fishery itself is managed.</p> <p>This statement would be justified if, for instance, there are spatial, temporal, effort or technical constraints on pikeperch fishing in order to protect non-target species / ETP species or habitats.</p> <p>SG80(c) refers to the “<i>outcomes of</i></p> | <p>As stated, the partial strategy comprises the fishery management measures employed – essentially prescription of gear types, control of effort and monitoring and surveillance of the fishery and ecosystem.</p> <p>As described in the report, information on the lake ecosystem is considered in the management and operation of the fishery, e.g. in locating fishing locations, in monitoring key prey species (smelt), in monitoring the effects of temperature and productivity on fish populations.</p> <p>As described throughout the report, such measures are not necessary,</p> <p>Such views are captured by the outcome of</p> |



| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
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| | | | | <i>monitoring</i> ” which have reassured stakeholders that the partial strategy is likely to work. Including this information somewhere in the report would support this rationale and the associated scoring. | the RBF assessment. |
| 2.5.3 | No* | No | NA | <p>There is a paucity of information relating to this PI presented in the report or referred to in the scoring.</p> <p>The scoring rationales at SG100(c),(d),(e) simply reiterate the narrative of the SG. No information is presented to support the scores either in the rationales or elsewhere in the report. Evidence for scoring the fishery is not provided, and the scoring level not supported by the rationale.</p> | The key issues are identified in the scoring comments and each have been outlined in the report and earlier scoring comments, we do not wish to repeat the same text several times. Additional references have been added in support of the scores awarded. |
| | | | | | |
| 3.1.1 | Yes | Yes | NA | At SG100(d) it is stated that “A codified system exists by which prospective applicable fishers apply for a licence which is | New licenses are not issued for stocks which are considered depleted. |



| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
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| | | | | <p><i>granted under consideration of the status of the target populations.</i> (my emphasis). It would be useful to explain the basis for these decisions and the fish population criteria that are used to determine whether or not licences should be issued.</p> | |
| 3.1.2 | Yes | Yes | NA | No comments. | |
| 3.1.3 | No | No | NA | <p>It is hard to evaluate the scoring of this PI because there is no evidence presented in the report to demonstrate the existence and content of a coherent management and suite of objectives for the fishery.</p> <p>However, at SG80(a) it is stated that “<i>The long term objective is to maintain a sustainable commercial fishery on the lake.</i>” Elsewhere in the scoring, at SG3.1.1. 100(d) the importance of providing a sustainable livelihood is emphasised.</p> <p>It is unclear from the information presented in the report whether the overall objective of</p> | <p>The stated objective is to maintain a sustainable commercial fishery – this is dependent upon a sustainable stock and lake ecosystem and management clearly takes full account of these factors. It should be remembered that this is a traditional small-scale fishery within a discrete lake.</p> |



| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
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| | | | | <p>management is to maintain the commercial viability of the fishery or to sustain the fish stock; the two concepts are conflated, confused and used interchangeably in the text.</p> <p>It would be helpful if the agreed management objectives for the fishery were included somewhere in the report, to justify the score awarded here and elsewhere under P3.</p> <p>At SG80(a) it is also unclear how the short and long term objectives for the fishery meet the requirements of Principle 2 of the MSC standard; the rationale appears to address only the target species.</p> <p>At SG80(a) the rationale is repetitive and tautological.</p> | |
| 3.1.4 | No | No | NA | <p>Again, the paucity of information in the report makes it difficult to assess the rationale.</p> <p>At SG80(a) there is considerable ambiguity</p> | <p>The comments above apply equally here.</p> <p>Additional text has also been added to the</p> |



| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
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| | | | | <p>in the rationale; it is unclear whether the management system is acting to protect fishermen's livelihoods or the status of the fish population (which are related but different goals). Focussing on fishermen's livelihoods could, for instance, have perverse incentives on the fish stock.</p> <p>At SG80(a) it is also stated that the allocation of licences is "<i>informed in a manner consistent with the promotion of a sustainable fishery</i>". In the absence of a clear explanation of the licence allocation procedure (mentioned previously), it is not clear whether this means sustainable with respect to the fish stock or the livelihoods of fishermen.</p> <p>At SG80(a) there is no evidence presented to demonstrate that the management system provides incentives relevant to Principle 2 (though it is clear from other parts of the report that such incentives seem to exist). This issue should be clearly addressed here.</p> | <p>report and scoring table illustrating the cooperative approach between management and fishermen to maintain stocks.</p> <p>As above, the two are both considered in licence allocation – constraining effort limit the limits of a sustainable stock.</p> <p>As has been described throughout the report and above, limiting effort in the pikeperch fishery also achieves desirable outcomes for the lake ecosystem.</p> |



| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
|-----------------------|--|--|---|---|---|
| | | | | The rationale does not presently support the score awarded. | |
| | | | | | |
| 3.2.1 | No | No | NA | <p>There is no evidence presented here or anywhere else in the report of the existence of any agreed short and long term objectives for the fishery.</p> <p>The rationale refers to “<i>procedures to measure fishery parameters</i>” and that these are “<i>monitored on an ongoing basis and considered in relation to objectives for each [parameter]</i>”. Neither the results of the monitoring nor the objectives for each parameter are reported in the assessment. It is therefore unclear whether the objectives meet the MSC Standard or indeed whether the fishery meets the objectives.</p> <p>Elsewhere in the report (at §3.5.6 & PI 3.2.2 80(b)) it is stated that population levels are known “<i>implicitly</i>”. This being the case, the</p> | <p>Additional material has been provided in the report detailing the monitoring in place, and the results of this monitoring; particularly for target and bycatch populations. Management measures are in place to control aspects of the operation of the fishery to meet the overall long-term goal.</p> <p>The requirement is that <u>objectives</u> are explicit in the management system. Absolute stock levels required are not yet determined (this is</p> |



| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
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| | | | | <p>explicit objectives required at the SG80 cannot be met here.</p> <p>The rationale also refers to the MLS and closed area; these are not objectives, but are harvest control rules and tools.</p> | <p>a condition of certification).</p> <p>The objectives are to maintain the commercial fishery and stock – the MLS and protected spawning areas operationalise this objective.</p> |
| 3.2.2 | No | No | NA | <p>Again, evaluation of the scoring is compromised by the paucity of information presented in the report.</p> <p>At SG80(a) it is unclear how licence applications are evaluated relative to stock status. It is also not clear whether this process is limited to new applicants or the renewal of existing licences.</p> <p>At SG80(b) there is no evidence of the linkage between monitoring results and management decisions (though it would seem from the text of the report at §3.3.2 that the management system has in the past responded to concerns about the status of the stock, and this episode could usefully</p> | <p>Additional information has been added in the report.</p> <p>Licenses are valid for 3-5 years and are reviewed by licensing authorities against all data.</p> <p>Processes use the available information and are able, particularly with pre-recruit data, to respond to 'serious and other important issues'. As the reviewer notes, responses have been made in the past.</p> |



| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
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| | | | | <p>inform the rationale here).</p> <p>At SG80(c) no evidence is presented to show how the precautionary approach is used in the fishery (as distinct from fishery managers being cautious, which is an altogether different concept).</p> <p>At SG 100(d) some evidence of the formal reports should be presented in the document, if only in the bibliography.</p> | <p>A clear example is the use of pre-recruit data as a basis for management.</p> <p>This was determined during the site visit through discussions with managers and fishermen.</p> |
| 3.2.3 | No | No | NA | <p>SG 80(a) indicates that significant part of the lake is private, and outside the enforcement control of the County boards. There is no clear evaluation of the amount of fishing activity in this area, or the degree to which the role of the management bodies are fettered in the private fisheries (for instance, does the MLS still apply; what about mesh size controls for gill nets?). This requires further explanation.</p> | <p>Additional text has been added to report; fishermen must apply to the relevant county to be able to use trap nets even if he owns the water area in which he fishes. Ownership is only at lake shore and will not significantly affect the gill-net fishery.</p> |



| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
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| | | | | <p>SG80(b) also needs to clarify the situation with respect to the private fisheries around the lake. Can these sanctions be applied in these areas?</p> <p>SG80(c) refers to SG100(c). The rationale for SG100(c) states that this SG is not met. A rationale is therefore required to explain why SG80(c) is met.</p> <p>SG100(c) states that fishermen are actively engaged in data collection – examples should be given here, cross-referencing (I imagine) to their participation in monitoring of fish stocks described in other parts of the report.</p> | <p>As described in the report, these private waters are restricted to lakeshore areas; these are not subject to enforcement but are monitored. Work with managers and fishermen has developed a conservation-minded approach, especially in handling fish returned to the lake.</p> <p>SG80(c) corrected.</p> <p>As above. An example is the collaborative project on survivorship of returned fish.</p> |
| 3.2.4 | No | No | NA | <p>The MSC scheme defines a research plan as “a written document that includes a specific research plan for the fishery under assessment”.</p> <p>At SG80(a) there is no evidence presented in the report to show that a research plan in the sense required by the MSC scheme exists,</p> | <p>Research is undertaken by the new Swedish Agency for Marine and Water Management https://www.havochvatten.se/en/start/about-us/publications.html. Additional text has been added to report and scoring comments.</p> |



| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
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| | | | | <p>the topic(s) that it covers, research priorities, partners etc.</p> <p>At SG80(b), it is stated that research is disseminated through websites and other publications. I have used Google, and can find no evidence of research information published on the internet for the Lake, though that may of course be down to the search terms I have used. The URLs of relevant websites should be provided, as well as details of the publications referred to in the rationale.</p> | |
| 3.2.5 | Yes | No | NA | The score is justified, providing that some more evidence of how the fishery meets the SG80(a) standard can be provided. | Additional supporting references added. Much evidence was demonstrated during the site visit. |



Any Other Comments

| Comments | Conformity Assessment Body Response |
|---|--|
| <p>References</p> <p>As noted previously, all of the PIs cite “Site Visit” as the source of information.</p> <p>The current draft of the report does not contain any written accounts of meetings held at the site visit. Although the MSC Certification Requirements do not demand that stakeholder comments from the site visit are included in the Peer Review Draft report, their absence in this case raises a great deal of uncertainty about the overall assessment outcome, as this is the only source of information that the assessment is based upon.</p> | <p>Additional supporting references have now been added throughout the report to support the information gathered during the site visit.</p> |



For reports using the Risk-Based Framework:

| Performance Indicator | Does the report clearly explain how the process used to determine risk using the RBF led to the stated outcome? Yes/No | Are the RBF risk scores well-referenced? Yes/No | Justification: Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response: |
|-----------------------|---|--|--|---|
| 1.1.1 | Yes | No | <p>SICA The SICA scoring is adequately explained.</p> <p>PSA The source of the life history data use to determine the “productivity” attributes in the PSA are not attributed to a verifiable source of information. Whilst the scores all seem appropriate, adequate referencing is required.</p> | Information was taken from published sources and fishbase. |
| 2.1.1 | No | Yes | <p>Fish traps It is stated that the morphology of bream mean are “<i>caught at a length at which perch would escape</i>” (i.e. bream are caught at a smaller length than perch). The size at which they are caught and the relationship between this size and the size at maturity for bream in the Lake is not considered, but is important for the conclusions of the SICA analysis.</p> <p>Gill nets It is noted in the commentary that burbot are large, slow growing and late maturing.</p> <p>There is no indication of the quantity of burbot caught in this fishery; nor any indication of the proportion of the</p> | <p>This is not the case – only large fish are retained and smaller fish are returned to the lake. As discussed previously, measures are in place to maximize survivorship of fish returned to the lake. These factors were all considered by experts during the SICA assessment.</p> <p>Burbot are extremely rare catches in gill nets – again, a factor considered by the experts involved in the SICA workshop.</p> |



| Performance Indicator | Does the report clearly explain how the process used to determine risk using the RBF led to the stated outcome? Yes/No | Are the RBF risk scores well-referenced? Yes/No | Justification: Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response: |
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| | | | <p>fish that are caught and retained that are immature.</p> <p>Both fisheries Elsewhere in the report there is reference to logbook data of fish landings and its analysis to reveal CPUE trends – none of this information appears to have been taken into account here to substantiate or inform the outcome of the SICA assessment here, which seems a significant shortcoming.</p> <p>It is possible that the scores awarded to the two different fishing methods could prove to be quite different if all of this information is taken into account, calling into question whether this is not one but in fact two units of certification.</p> | <p>The SICA workshop involved key scientists, managers and fishers involved in the fishery; all of this information and expertise was brought to the workshop.</p> <p>There are two units of certification (see above) and scores were awarded for each separately in the RBF.</p> |
| 2.2.1 | Yes | Yes | No comments, other than that the commentary supports the notion that there are two separate units of certification here with different characteristics. | See above – there are two UoCs |
| 2.4.1 | Yes | Yes | No comments. | |
| 2.5.1 | Yes | Yes | No comments. | |



For reports assessing enhanced fisheries:

| <i>Does the report clearly evaluate any additional impacts that might arise from enhancement activities?</i> | Yes/No | Conformity Assessment Body Response: |
|--|--------|--------------------------------------|
| <u>Justification:</u> Not applicable | | |



Peer Review B

Version 1, January 2011

Overall Opinion

| <i>Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?</i> | Yes/No Yes/No | Conformity Assessment Body Response |
|--|--------------------------|--|
| <i>Justification:</i> The reason for the uncertainty here relates to the lack of clarity in some parts of the assessment. Also a number of the PIs are judged based on the RBF and the initial rationale for the RBF assessment need to be better justified to allow the scores applied and the final SG category to be assigned. This has knock on effects from the first RBF to other PIs that are linked. | | Items addressed below. |

| <i>Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe?</i> | Yes/No Yes | Conformity Assessment Body Response |
|---|-----------------------|--|
| <i>Justification:</i> Yes, but with some minor modification to the action plan the outcome will be clearer and more beneficial to the fishery management overall. | | Addressed below. |

If included:

| <i>Do you think the client action plan is sufficient to close the conditions raised?</i> | Yes/No Yes | Conformity Assessment Body Response |
|---|-----------------------|--|
| <i>Justification:</i> The client action plans are in the two conditions. They both appear to be clear and well worded. Even though there is some repetition of text in Condition 2. Condition 1 would benefit from inclusion of determination of population demographic data during the biomass assessment. Year class strength and length-weight relationship would be easy to add to the action with much added benefit, particularly when considering the wider ecosystem aspects of the fishery. The benefits will also be that data will be collected in line with legislative requirements under the EU Water Framework Directive. | | This has been added as a recommendation, but the outcome of the condition is directly linked to the metric of the scoring guidepost concerned. |

General Comments on the Assessment Report (optional)

In general I found the report to be clearly structured and easy to follow. There was however an issue with further details to help in the peer review. A number of the PIs were based on evidence that was presumably known by the assessors and the fisheries management

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personnel. This lead to some implicit justification for the assessment scores. The background information provided some of the evidence but in places needed to be more explicit.

The lack of necessary detail was also associated with the Risk Based Framework. As the RBF was the foundation behind a number of the scores it follows that it should be clearly justified. Whilst there is a section in the RBF appendices titled 'Justification' it requires some further detail to ensure again ensure that the scores are properly justified.

It would also have been helpful to have a contents page for easy navigation through the document.

IMM: these have been discussed below and added to the report where appropriate.



Performance Indicator Review

Please complete the table below for each Performance Indicator which are listed in the Conformity Assessment Body's Public Certification Draft Report.

| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
|-----------------------|--|--|---|--|-------------------------------------|
| 1.1.1 | Yes | No | No | The available information appears to have been used but not all the information is properly justified with appropriate evidence. The assessment uses the RBF but the rationale for the scores used is not clear (see RBF table below for details). The conditions on the fishery are necessary and will likely improve the performance to SG80 level however the corrections to the assessment need to be made first to judge. | Discussed under RBF |



| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
|-----------------------|--|--|---|--|--|
| 1.1.2 | No | No | NA | The disagreement here is primarily because of the reliance on 1.1.1 and the RBF. Any changes in 1.1.1 will have to be taken into account in other PIs that link to it. The other problem relates to the reference points. It is clear from the background detail that there are no clear reference points defined. In fact this is one of the major limitations to the fishery being considered within the SG100 category. Without a clearly identified and justified reference point the fishery cannot be judged any higher than within the SG80 category. | As RBF is used for PI 1.1.1, this PI <u>must</u> score a default 80. |
| 1.1.3 | Yes | Yes | NA | Agree, there is no apparent evidence for stock depletion. | |
| 1.2.1 | Yes | Yes | NA | Agree. It is noteworthy that this is another PI that the fishery cannot be assessed within the top SG category as there needs to be a harvest strategy effectiveness analysis implemented. This will not be met by the ongoing stock assessment. | |



| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
|-----------------------|--|--|---|---|-------------------------------------|
| 1.2.2 | Yes | Yes | Yes | Agree. The implementation of tools and rules needs to be properly addressed to ensure maintenance and potential improvement in the SG score. Condition 2 provides a clear action plan to address the implementation of harvest rules and tools. | |
| 1.2.3 | Yes | Yes | NA | Agree. It is important that there is ongoing work to improve aspects such as stock abundance for ensuring maintenance and potential improvement in the Score. | |
| 1.2.4 | Yes | No | NA | Likely to be affected by the outcome of reassessing 1.1.1. However any changes not expected to make a significant difference to the scores. | See RBF section. |
| | | | | | |



| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
|-----------------------|--|--|---|---|---|
| 2.1.1 | Yes | No | NA | Some further detail is required here particularly relating to the assessment of risk to retain species using the RBF. The judgement is made on the basis of overall catch tonnage for two species. The assessment of 200t versus 100t for two species with different requirements and trophic positions is not clear. Also, how the catch tonnage relates to the population size and also the size structure make up of these catches is not presented. This therefore makes it difficult to determine whether there is any likely risk. The risk has to be judged against something. | See RBF; the scores were derived from an expert panel of scientists, managers and fishermen – the use of expert opinion is a key part of a SICA assessment. |
| 2.1.2 | Yes | Yes | NA | Agree. The site visit is a useful evidence base however it would have been better if further detail on what was involved in the field visits was explicitly presented to again assist with reviewing this PI. | Additional supporting evidence has been provided. |



| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
|-----------------------|--|--|---|---|---|
| 2.1.3 | Yes | Yes | NA | Agree. The site visit is a useful evidence base however it would have been better if further detail on what was involved in the field visits was explicitly presented to again assist with reviewing this PI. | Additional supporting evidence has been provided. |
| 2.2.1 | Yes | Yes | NA | Good, clear evidence base presented. | |
| 2.2.2 | Yes | Yes | NA | Agree, however the assumption that non-target species are healthy needs to be revisited in the test programme to provide the clear evidence base. | Additional supporting evidence has been provided. |
| 2.2.3 | Yes | Yes | NA | Agree, this will be further supported by the test fishing. | |
| 2.3.1 | Yes | Yes | NA | Appears to be well supported and an appropriate assessment. | |



| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
|-----------------------|--|--|---|--|---|
| 2.3.2 | No | No | NA | Not all EU legislation has been considered, which may have a significant influence on the fisheries in the near and medium term future. Specifically the EU Water framework Directive. It requires member states to ensure water bodies do not deteriorate and move towards good ecological status by defined dates within planning cycles (2015, 2027 etc). During 2013 the WFD replaces the Freshwater Fish and Fisheries Directive so its influence should be considered in the fishery. It also has relevance to the wider ecosystem aspects of the project and defining reference points. | It has been noted in the revised report that monitoring by SUA takes account of the WFD requirements. |
| 2.3.3 | Yes | Yes | NA | Agree. It may be that some of the data collected needs to be reinterpreted in light of the WFD but this should be of benefit to the wider aspects of the fishery. | |
| | | | | | |



| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
|-----------------------|--|--|---|--|--|
| 2.4.1 | Yes | Yes | NA | In general agree, however there is a mention of habitat structure and function being potentially affected. There is a lack of explicit detail on how this was assessed therefore it is also not clear how agreement on the consequences was made (i.e. no detectable change). What metric or variables were used to judge any detectable change? This information should be provided to improve clarity for this PI. | This conclusion was the opinion of all experts at the SICA workshop. |
| 2.4.2 | Yes | Yes | NA | Agree. Evidence presented appears to justify the score | |
| 2.4.3 | Yes | Yes | NA | Agree. But more detail on how habitat type is identified when monitoring the fishery. Presumably this is anecdotal visual confirmation. Or it may be more systematic which would be better however it is not explained enough to know. | Overall bathymetry and habitat types have been mapped but ongoing monitoring of habitats is more anecdotal in combination with fishery observations. |
| | | | | | |



| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
|-----------------------|--|--|---|--|---|
| 2.5.1 | Yes | Yes | NA | Agree this is appropriate. One aspect that may need to be included is the vessels that the fishers use. Is there any risk associated with them such as pollution from engines/leaks/accidents etc and consideration of any consequences. Admittedly this may be small and localised but the risk will be higher if for example the fishing effort is in one location at a particular time so should be included. | Fishing effort is distributed across the lake; this was not identified as a significant issue by any participants in the SICA workshop. |
| 2.5.2 | Yes | Yes | NA | Agree in general. Note that there is not enough specific information for the SG100 category which limits potential to be assessed in this category. There appears to be enough for the other categories. | |



| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
|-----------------------|--|--|---|---|--|
| 2.5.3 | Yes | Yes | NA | Agree overall but the score should probably be lower. The evidence is not provided to support management and effects on the lake ecosystem, hence the SG100 categories are not appropriately assessed or justified, particularly 100e. Because of this it is good that other lake systems are referred to here. It may also be worth highlighting whether the ecosystem effects are effectively communicated to the fishers (either through using information from the lake and/or other lakes). This is particularly in relation to the definition and requirements under the WFD. | Additional evidence has been provided throughout the report. |
| 3.1.1 | Yes | Yes | NA | Agree. Looks a good system. | |
| 3.1.2 | Yes | Yes | NA | Agree. Assessment is appropriate and justified. | |
| 3.1.3 | Yes | Yes | NA | Agree. Assessment is appropriate and justified. | |



| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
|-----------------------|--|--|---|---|--|
| 3.1.4 | Yes | Yes | NA | Agree. Assessment is appropriate and justified. | |
| 3.2.1 | Yes | Yes | NA | Agree. Many of the PIs in Section 3 link to the site visit which is seen as an effective and first hand justification for the assessment made. It would however have been very useful to see some further information on the site visit agenda, topics covered and a summary of the discussions and key outputs. This would have clearly supported the evidence base. | Additional evidence has now been provided. |
| 3.2.2 | Yes | Yes | NA | | |
| 3.2.3 | Yes | Yes | NA | | |
| 3.2.4 | Yes | Yes | NA | | |
| 3.2.5 | Yes | Yes | NA | | |

Any Other Comments

| Comments | Conformity Assessment Body Response |
|---|--|
| A few other aspects of the report that I think are worth bringing to your attention: - the fishery has a lower number of fishermen compared to last time however there is no clear indication of whether this has led to any change in fishing effort. If the remaining fishermen deployed the same amount of nets or each of them fished more | Both fish trap and gill-net effort has declined – see new Figure 10. |

then there may not have been any change in the fishing pressure on the fishery. Whereas with lower number of fishermen using the same effort individually as the previous assessment would lead to a reduction in overall effort. These details would have been useful background context.

- mention is made of the regulation of permits and licences and the ability to remove them for violations. However there is no indication of how this can be achieved or whether it would be effective. There are clear rules but understanding how they are policed would have been useful. Some of this will be picked up by Condition 2 relating to harvest rules and tools.
- it is recognized that there is no defined reference point. This is not unusual given the requirements on an effective reference, however in parts of the assessment there is an assumption that there is a 'good' population of pikeperch and other species. Such a labeling appears subjective without some kind of reference. There is no doubt that some kind of reference would be very useful for a number of aspects of the fishery and I would encourage MSC to highlight this.
- closed areas and times are used in part to manage the fishery. Understanding the basis for the closure in terms of when it was set up and whether it is reviewed would have been useful. I would recommend that the basis is appraised at some stage to ensure that the spawning grounds and the timing of closure are appropriate. There may well be shifts owing to either internal (e.g. habitat change) or external drivers (e.g. climate change). It is known that warmer summers give stronger year classes and will likely affect growth and production not only of the pikeperch but other organisms. Hence some type of adaptive management approach which would include regular appraisal of delimited areas and times should be encouraged for the benefit of the fishery overall.
- the reference to discard survival is prevalent throughout the report. This is based on a tagging study which sounds like it would provide the right evidence to support the discard survival rate. However there is little detail on this tagging study. It was apparently based on the undersized fish but do we know the size make up and the numbers of the different sizes. Are all sizes likely to survive? Further detail is required to fully understand the tagging study results.
- the wider ecosystem assessment suffers from a lack of breadth in the data collected. There is a suggestion that there will likely be no significant changes in ecosystem structure and function due to the removal of non-target species. Such an assessment is not possible with the amount of information available from this lake. There are a number of elements that will relate to the structure and function but it is

Enforcement is carried out by officers of the County boards. These carry out regular patrols and inspections – based on knowledge of all fishing locations around the lake.

The RBF was used as there is no stock assessment or reference points in place; a condition is now in place requiring these by the next assessment.

The scientific programme is likely to involve such reviews, these are not essential for management nor MSC certification, however.

Additional information on this has been provided.

Quite a lot of information and understanding of lake ecosystem function is available, but as this is not fully comprehensive, the RBF was used to determine likely effects.



too sweeping a judgement that is presented. The data presented gives some insight into changes associated with fish of the size captured which form part of the population and community structure but how those removed and remaining change in functional terms is not assessed. I would advise that the wording is alter to reflect the actual level of information that is available, which is part of the overall structure and function of the ecosystem.

- at one point (p16) there is reference to implicit knowledge about the population levels. This is too subjective to allow an appropriate assessment of the point being made. Any such implicit understanding needs to be captured in some way so that it can be presented as clear evidence.

This was the reason for using the RBF, although this assessment was supported by various indices of population status – more detail on these has now been added to the report.

For reports using the Risk-Based Framework:

| Performance Indicator | Does the report clearly explain how the process used to determine risk using the RBF led to the stated outcome? Yes/No | Are the RBF risk scores well-referenced? Yes/No | Justification: Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response: |
|-----------------------|---|--|--|---|
| 1.1.1 | No | No | The scale for each score is not provided so knowing what a 2 or a 6 score means completely depends on what it is referenced to. Furthermore, the PSA assessment is broken down into Gill Nets and Traps. The selectivity is assessed by comparing the stretch mesh size versus the length of the fish. I would be expected that the girth (cross sectional size) of the fish was used and this will not be around double the mesh size as stated. The same selectivity justification is provided for the traps. This is not correct as the document does not provide a standard mesh size for the traps (it is stated that a variety are used) and | The RBF methodology is prescribed in the MSC Certification Requirements. This pro forma report template does not contain an explanation of all of the components and so readers are referred to the CR for more detail. |



| | | | | |
|-------|----|----|--|--|
| | | | <p>indicates that small fish that are caught are used to study incoming year class strength so the mesh size must be lower than the gill nets. 43% of the data relate to the fish traps so the selectivity score of 3 needs adjusted.</p> <p>There are a number of statistics used to justify the RBF score but they do not have any context to allow the reviewer to determine how valid the scores are. This is the only form of reference used.</p> | |
| 2.1.1 | No | No | <p>The remainder of the risk based scores all follow a similar format as 1.1.1. There is little difference in the justification hence the same problems exist for them as those associated with 1.1.1.</p> <p>Specific comments that relate to each RBF-based PI can be found in the main PI table above.</p> | |
| 2.2.1 | No | No | | |
| 2.4.1 | No | No | | |
| 2.5.1 | No | No | | |



Appendix 3. Stakeholder submissions

Stakeholder comments have been received from two stakeholders, the Swedish Ornithological Society (SOF) and the MSC. The MSC comments are appended to this report.

The SOF submission and responses are set out below.

| Performance Indicator | SOF Comment | Assessment Team Response |
|-----------------------|--|--|
| 2.3.1 | <p>The certifier has given the fishery a score of 100 for this PI, which demands that "there is a high degree of certainty that the effects of the fishery are within limits of national and international requirements for the protection of ETP species", along with a high degree of confidence that the fishery is not having detrimental direct or indirect effects on ETP species. We believe that this scoring is inappropriate given the data presented and that the shooting of cormorants in the area should be considered under the impacts of the fishery. Without more information on the impact of this culling, and an accurate assessment of bycatch, it is certainly not possible for this fishery to achieve either the SG80 or SG100 requirements and very difficult to assess whether this fishery actually meets the SG60 requirements. Irrespective, a sub-SG80 score would appear appropriate with the information that is presented. Justification of our assessment is given below.</p> <p>Given that waterbird bycatch is the only issue identified for this fishery under this PI, we believe more data should be presented. Data from the Swedish Ringing Centre, back to the year 2000, includes recoveries of 49 waterbirds of which 10 (all cormorants) are reported to have been found dead in fishing gear. Thus, these data agree with the overall picture given in the report. The data on recoveries of ringed birds does, however, not give the full picture of the extent of by catch. Different bird species are not ringed to the same proportion and conclusions cannot be based solely on ringing recoveries. We therefore suggest that the "previous certification and surveillance reports" should be properly</p> | <p>The initial assessment of this fishery gave rise to a condition to evaluate bird bycatch; naturally this focussed on fish traps as gill-nets are set under ice. Progress in addressing and closing this condition has been set out in previous surveillance audits (found in http://www.msc.org/track-a-fishery/fisheries-in-the-program/in-assessment/inland/lake-hjalmaren-pikeperch/assessment-downloads). All information,</p> |

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| | | |
|--|--|---|
| | <p>referenced so that the methods and results of the undertaken studies are easily accessible and shown to be robust - otherwise, we would disagree that there can be a high degree of confidence that the fishery is not having a direct detrimental effect on the local cormorant population. Adding a condition for this fishery to directly assesses bycatch levels would build an understanding of whether this is an issue.</p> <p>Further, the annual culling of cormorants should be considered either a direct or indirect consequence of the fishery - it is the county administrative board (Länsstyrelsen) that takes the decision to allow hunting, following application from e.g. fishermen organisations, when fishermen consider the local cormorant population to be in conflict with the fisheries. The statement made in the report, in response to reviewer comments (p. 102-103), that “Cormorants are not culled in response to the specific lake Hjälmaren fishery, but as part of wider governmental programme.” does not seem to agree with the basis for the decisions made by the Örebro län county administrative board (see decisions Tillstånd till skydds jakt efter skarv i Hjälmaren, Dnr: 218-9142-2012 and Dnr: 2182-04186-2008, enclosed). The decisions are in Swedish but further information can be provided by Örebro Län county administrative board officer Johanna Månsson Wikland, tel +46 19 19 39 22.</p> <p>Scientific assessments of the impact of cormorants on local fisheries are rarely carried out. As far as we know, no convincing evidence has been presented to indicate that cormorants pose any major threat to the fishery at the lake Hjälmaren - making justification of this cull weak. It is of reputational risk to the MSC to certify a fishery that advocates for a cull without scientific evidence.</p> <p>With regard to indirect effects (scoring issue (c)), Lake Hjälmaren is an important staging area for several migratory birds in late summer and autumn. The Caspian tern is one of them and the regional ornithological</p> | <p>included that provided here by SOF, is that cormorants are the only species affected to any significant extent.</p> <p>On further investigation, there appears some interest in having a cull from Hjälmaren pikeperch fishers, but this is one of a number of interests. The culling is part of a wider management for fisheries in Hjälmaren. There are 26 licensed and active fishermen on the lake, while some 80 hunters are involved in the culling (number of hunters according to the comments provided by SOF). There are basically two types of cormorant hunting allowed in Lake Hjälmaren, one in the immediate surroundings around fishing gears and the other conducted over much larger areas. Most important to the certification is if the by-catch of cormorants in the fishing gears and by the culling motivated by this fishery have had negative effects by impacting the size of the population of cormorants. This is, according to studies in the area (Sildén and Strand 2010) not the case: “reasonably the impact of culling on the cormorant population is marginal”.</p> <p>With regard to indirect effects of the hunting activities, the decisions on hunting permissions are spatially stratified to protect areas that</p> |
|--|--|---|

| | | |
|--|---|---|
| | <p>society has expressed concern that the cormorant hunting disturbs the terns and other protected birds. Hunting involves regularly up to around 80 hunters at the same time and those spread out all over the lake and little space is left for the birds to find undisturbed areas. Given the links between the cormorant cull and the fishery, this indirect impact needs to be assessed under scoring issue c.</p> | <p>are considered of special interests to other species of birds. Hunting is less intensive (and extensive) than other human activities on the lake. We also note that with the current management scheme resulting in decreased quantities of deployed fishing gears, by-catches of birds have decreased and number of gears in which vicinity hunting is allowed, have also decreased.</p> <p>Additional comment has been added to the scoring rationale for PI 2.3.1, but, as stated, we remain of the opinion that the SG100 requirements are met in this regard.</p> |
| | <p>Bird monitoring on the lake is inadequate to assess potential impacts on local bird populations. To our knowledge, the Museum of Natural History does not undertake any bird monitoring within the lake. Cormorants are monitored every third year by the regional ornithological society NOF on behalf of county administrative boards. Regular monitoring of some raptor species takes place in the area. Other birds are counted now and then. Potential impacts on all relevant local breeding populations and migratory birds are thus difficult to assess.</p> | <p>For PI 2.3.3, we take the only potentially significant interaction to be that with cormorants. For this, populations are sufficiently well monitored. We would not consider it appropriate to monitor all bird populations without a sound basis for doing so.</p> |

Responses made by the assessment team are listed below, referenced to each MSC comment.

| MSC Ref | Assessment Team Response |
|---------|--|
| 3844 | The original site visit meetings were held in 2011 before this requirement was introduced. Section 4.4.1 has been amended accordingly. |
| 3845 | This relates to the surveillance audit and has been clarified in the wording of the client action plans. |
| 3846 | The wording of PIs 3.1.1 and 3.1.3 has been made more explicit. |
| 3848 | The wording of PI 3.2.4 has been expanded. |
| 3856 | TED is changed to 20 Feb 2013. |
| 3857 | Footer amended |
| 3860 | PI 1.2.2 and 1.2.3 amended |

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| | |
|------|--|
| 3861 | PI 2.1.3, 2.4.2, 2.5.2, 2.5.3, amended |
| 3862 | As set out in the report, the scores allocated are the same for each gear type unless identified separately. This has now been confirmed for each P2 PI and clarified where appropriate in the text. |
| 3863 | As detailed in the RBF section of this report, a highly informed and representative set of stakeholders discussed the SICA consequence scores and reached unanimous conclusions on each case. Additional text has been added to this effect. |

Appendix 4. Surveillance Frequency

A surveillance audit may be conducted as either an “on-site” or “offsite audit”. This is determined by using criteria set out by the MSC:

| Criteria | Surveillance Score | <i>Hjalmaren Pikeperch Fisheries</i> |
|-------------------------------|--------------------|--------------------------------------|
| 1. Default Assessment Tree | | |
| Yes | 0 | 0 |
| No | 2 | |
| 2. Number of Conditions | | |
| Zero Conditions | 0 | |
| 1-5 Conditions | 1 | 1 |
| >5 Conditions | 2 | |
| 3. Principle Level Scores | | |
| ≥ 85 | 0 | |
| <85 | 2 | 2 |
| 4. Conditions on outcome PIs? | | |
| Yes | 2 | 2 |
| No | 0 | |
| Total | | 5 |

A score of 5 means normal surveillance:

Table A4: Fishery Surveillance Plan

| Score | Surveillance Category | Year 1 | Year 2 | Year 3 | Year 4 |
|-------|-----------------------|----------------------------|----------------------------|----------------------------|---|
| 5 | Normal Surveillance | On-site surveillance audit | On-site surveillance audit | On-site surveillance audit | On-site surveillance audit & recertification site visit |



Appendix 5. Client Agreement

Hjälmarens Fiskareförbund have confirmed acceptance of the Public Certification Report.

Appendix 5.1 Objections Process

No objections were received.