Executive Summary of the IUCN Red List Assessment for

Sockeye Salmon *Oncorhynchus nerka*:

The Salmonid Specialist Group (SSG) of the Species Survival Commission of IUCN World Conservation Union has been focusing on range-wide status assessments of salmonids. This assessment represents the first effort to add an anadromous (that is, sea-run) Pacific salmon to the IUCN Red List of Threatened Species. We considered extinct and extant populations throughout the native range of the species, including the United States of America (States of Washington, Idaho, Oregon and Alaska), Canada (Province of British Columbia, Yukon Territory) and the Russia Federation (Kamchatka, Koryakia, Magadan, Chukotka). We assembled data on range and adult abundance (over 12 years, representing three generations) for sockeye salmon *Oncorhynchus nerka* from 243 separate spawning sites across the Pacific Rim. Using this database and some additional information, we evaluated the status of anadromous sockeye salmon at both global and subpopulation scales according to IUCN Red List criteria version 3.1.

We provide Red List categories for sockeye salmon at both the global population level and for a total of 80 subpopulations defined by freshwater and marine ecoregional groupings and genetic differentiation. The subpopulations, as a result of guidelines stipulated by IUCN, represent coarse units defined by extremely low rates of geneflow (less than or equal to one effective migrant exchanged per year) and, as a result, may contain numerous spawning sites supporting sockeye salmon adapted to specific nursery lakes or river reaches. For our global population assessment, we relied on IUCN Red List geographic-range criteria, and concluded that the species as a whole is not threatened and, thus, *propose* to characterize its current status as Least Concern. Out of the total of 80 subpopulations making up the global population, we were unable to assess the status of 26 of them and *propose* to list them as Data Deficient. We identified five subpopulations as Extinct. Of the remaining subpopulations, we *propose* to list nearly 35% as Threatened (17 out of a total of 49 evaluated subpopulations), and an additional two as Nearly Threatened.

We quantified the trend in adult abundance (that is, the rate of change or "change rate") for all spawning sites for which we had data. In some cases we characterized the status of a given subpopulation based on the change rate from a single spawning site. In cases where we had trend data from two or more sites, we estimated the decline rate applied to the subpopulations as the median rate of change across all spawning sites. This change rate was converted to status based on rules established by the IUCN: Vulnerable – 30-50% rate of decline, Endangered – 50-80% rate of decline, and Critically Endangered – greater than 80% rate of decline. Subpopulations shown to be stable or increasing in abundance were identified as Least Concern. Additional IUCN criteria were applied that relate to extent of range, absolute abundance, and the quality of habitat to arrive at a final listing.

Here we *propose* 2 subpopulations to be listed as Near Threatened, 3 as Vulnerable, 10 as Endangered, and 4 as Critically Endangered. While all of the countries listed above contained threatened subpopulations, the greatest number and concentration of threatened subpopulations

were located in the Province of British Columbia, Canada. Two subpopulations in the Columbia River, one that spawns in the USA and the other in Canada, show relative stability in their abundance; however, we *propose* to add them to the Red List as Near Threatened given the degree of habitat fragmentation and the degraded quality of their migratory habitat resulting from hydropower development in the region. We present the *proposed* listings in table form below (Tables 1, 2) and in the form of two maps (Figures 1, 2).

The key threats to the species identified by the SSG were:

- Mixed stock fishing leading to over fishing small, less productive populations
- Changing river and ocean conditions that are likely linked to global climate change, expressed in poor marine survival rates and increased incidence of disease in adult spawners
- Negative effects of hatcheries and construction of artificial spawning habitat

It is important to note that in many cases, the causes for declines in some specific sockeye salmon subpopulations remain unknown.

Needed conservation measures identified by the SSG include:

- Emphasize the pivotal role that Fisheries and Oceans Canada play in protecting sockeye salmon, and encourage them to fully implement their Wild Salmon Policy and underscore the importance of building partnerships to achieve their conservation goals
- Shift fishing pressure from coastal and lower river locations to more terminal, upriver locations to prevent mixed stock fishery effects on small, unproductive populations
- Enact rules that require measuring stock composition of catch in fisheries
- Reform and/or expand current monitoring programs where needed to improve tracking of status at a more localized, spawning site scale
- Curtail or modify enhancement activities that have been shown to lead to declines in neighboring small, unproductive stocks to reduce their threat to wild salmon
- Given we have little, direct control over ocean conditions that may lead to reduced salmon survival rates, pursue new research that focuses on other agents of mortality at different life stages to help illuminate new ways of conserving the species.

This effort sets a new precedent for identifying threatened Pacific salmon populations and helps raise awareness of wild salmon conservation at the international level. The assessment document has been formally submitted to IUCN, and, if approved by the IUCN, the species will be added to the 2008 IUCN Red List later this year.

Table 1. IUCN Subpopulation Listings by region:

Russia (12):

10: Data Deficient

1: Least Concern

1: Endangered

Transboundary (RU/AK, 1):

1: Least Concern

Alaska (20):

10: Data Deficient

8: Least Concern

1: Vulnerable

1: Endangered

Transboundary (AK/BC or AK/BC/Yukon, 4):

3: Least Concern

1: Endangered

British Columbia (33):

6: Data Deficient

15: Least Concern

2: Vulnerable

7: Endangered

3: Critically Endangered

Transboundary (BC/WA, 3):

1: Least Concern

1: Near Threatened

1: Extinct

State of Idaho (2):
1: Critically Endangered
1: Extinct

State of Oregon (2):
2: Extinct

State of Washington (3):
1: Least Concern
1: Near Threatened
1: Extinct

Table 2. IUCN Subpopulation listings for selected major river/watershed:

Bristol Bay (Alaska): 1 subpopulation - Least Concern

Kodiak Island (Alaska): 1 subpopulation - Least Concern

Cook Inlet (Alaska): 1 subpopulation - Least Concern

Copper River (Alaska): 1 subpopulation - Least Concern

Stikine River (AK/BC Transboundary): 1 subpopulation – Least Concern

Nass River (BC): 1 subpopulation – Least Concern

Skeena River (BC): 5 subpopulations - 1 Data Deficient, 1 Least Concern, 1 Vulnerable, 1 Endangered, 1 Critically Endangered

Barkley Sound (BC): 1 subpopulation - Least Concern

Fraser River (BC): 11 subpopulations - 6 Least Concern, 1 Vulnerable, 3 Endangered, 1 Critically Endangered

Columbia River (BC/WA/OR/ID): 8 subpopulations - 2 Nearly Threatened, 1 Critically Endangered, 5 Extinct

Figure 1. Status of IUCN Sockeye Subpopulations North Pacific
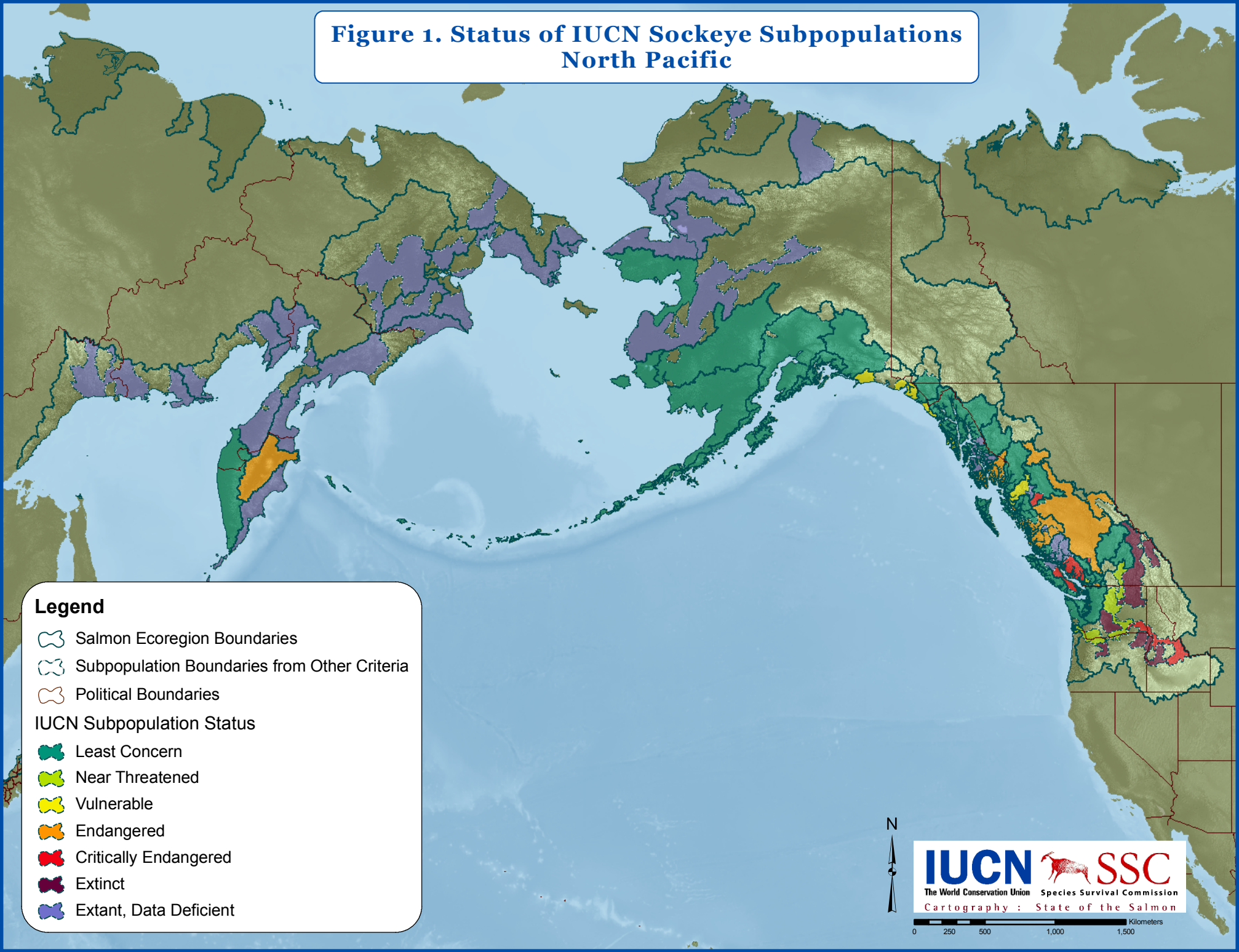
Legend

- Salmon Ecoregion Boundaries
- Subpopulation Boundaries from Other Criteria
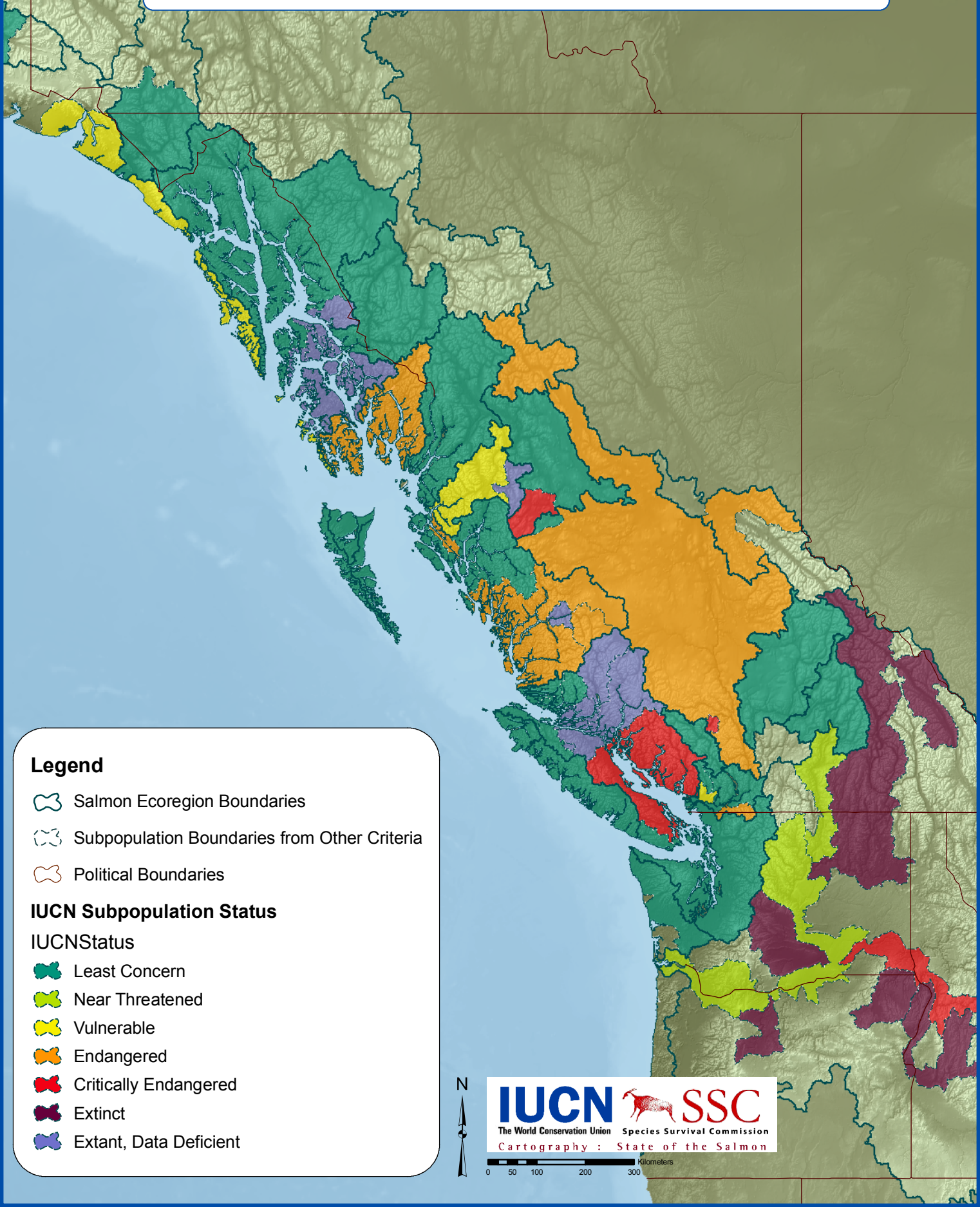- Political Boundaries

IUCN Subpopulation Status

- Least Concern
- Near Threatened
- Vulnerable
- Endangered
- Critically Endangered
- Extinct
- Extant, Data Deficient

IUCN The World Conservation Union **SSC** Species Survival Commission

Cartography : State of the Salmon

N

Kilometers
0   250   500   1,000   1,500

Figure 2. Status of IUCN Sockeye Subpopulations Southeastern Range

Legend

- Salmon Ecoregion Boundaries
- Subpopulation Boundaries from Other Criteria
- Political Boundaries

IUCN Subpopulation Status

IUCNStatus

- Least Concern
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Cartography : State of the Salmon

Kilometers
0 50 100   200   300