

unknown factors controlling the summer concentration of green sturgeon in the Columbia River. The catch data were analyzed to determine if there were any trends in data and if they were significant. Length frequency of the catch data was also examined over the period of 1985–2001 to see if the fishery was affecting the size structure of fish that concentrate in the Columbia River. Analysis of the data suggests that catch in the Columbia River has increased slightly over time; however, the trend was not statistically significant. In contrast, Rein (2002b) analyzed CPUE data for green sturgeon in the lower Columbia River commercial fishery over the same period of time (1981–1993) and found there was a statistically significant increasing trend. There was little evidence of a trend in the length-frequency distributions of catch over time. However, there does appear to have been an increase in the average length of green sturgeon taken in the fishery over the past few years, possibly suggesting that a strong year class is moving through the fishery.

The status review identified potential risk factors for the northern green sturgeon DPS including harvest bycatch in several fisheries, the concentration of spawning in the Klamath River, the loss of historical spawning habitat, and the lack of adequate abundance and population trend data (NMFS, 2002). While there is some information relevant to harvest bycatch, limited information is available about the distribution of historical and current spawning activity, and the loss of spawning habitat. The lack of adequate abundance and population trend data is of concern because it is difficult to assess the status of the population without such data. As a result, there is considerable uncertainty regarding the extent to which these factors affect the overall level of risk faced by this DPS.

The Klamath River is thought to support most of the total spawning population in this DPS and there is concern that this could increase the vulnerability of the DPS to catastrophic events. However, the extent to which spawning is concentrated in the Klamath River is not well documented and there is limited information on the extent and magnitude of spawning elsewhere in the DPS. Recent information, for example, has documented spawning in the Rogue River (Rein *et al.*, 2001) and the possibility of spawning in the Umpqua River is also being investigated (ODFW 2002). Further research and monitoring in these and other coastal watersheds may provide new information about the magnitude and geographical extent of

current spawning within this DPS and the importance of the spawning population in the Klamath River. Historical accounts, and what little data are available, suggest there has been a loss of spawning habitat in the Eel River and South Fork Trinity Rivers due to anthropogenic changes and natural events that increased sedimentation (CDFG, 2002). At the same time, it is uncertain to what extent the loss or reduction of spawning in the Eel and South Fork Trinity Rivers has affected this DPS or the extent to which it places the DPS at greater risk since there is virtually no information documenting the magnitude and extent of spawning that historically occurred in either system. Although spawning apparently no longer occurs in the South Fork Trinity, there is recent evidence of limited green sturgeon spawning in the Eel River based on the collection of both adult and juvenile fish in the mid 1990s (CDFG, 2002).

The status review examined the available harvest bycatch data in an effort to assess the effects of harvest on green sturgeon in this DPS and in general, but concluded it was not possible to directly assess harvest impacts because of two factors. First, most of the harvest occurs on summer concentrations of fish in the Columbia River and coastal Washington estuaries that are comprised of fish from a mixture of spawning populations and both DPSs. Second, there is no estimate of the size for any of the known spawning populations that occur in either DPS. Although direct assessment of harvest impacts on this DPS may not be possible with the available data, a qualitative assessment of green sturgeon bycatch data for various fisheries since the mid 1980s suggests that the impacts to green sturgeon from harvest bycatch have been greatly reduced in recent years.

Harvest of green sturgeon occurs almost entirely as bycatch in commercial fisheries for white sturgeon in Oregon and Washington, as well as a variety of smaller tribal fisheries (e.g. Klamath River tribal fisheries). Green sturgeon harvest data for these fisheries were summarized in the status review for the years 1985–2001, and over this period the vast majority of the total harvest was taken in the Columbia River sport and commercial fisheries (51 percent) and the various Washington coastal fisheries (28 percent). The remainder of the total harvest occurred in the coastal Oregon fisheries and the Klamath River tribal fisheries. Since the mid 1980s, the total annual harvest of green sturgeon in all of these fisheries has declined nearly six fold from

approximately 6,870 fish/year in 1985–1989 to approximately 1,190 fish/year in 1991–2001 (Table 1 in NMFS 2002). In 2001, the total harvest in all fisheries declined to less than 800 fish, with approximately equal numbers of fish taken in the Columbia River, coastal Washington, and Klamath River fisheries. This overall decline in green sturgeon harvest has been driven principally by a major reduction in the harvest from the Columbia River and Washington coastal fisheries since the mid 1990s.

The average length of green sturgeon caught in the Columbia River commercial fishery has been increasing since 1990, with the largest average size of fish occurring in the last five years. This trend may indicate a larger average size of fish due to reduced exploitation, a strong year-class moving through the fishery, or a reduction of small fish due to reduced or failed recruitment.

Much of the harvest reduction in recent years is due to increasingly restrictive regulations in the Columbia River fisheries (Appendix 1, Tables 1 and 2 in NMFS 2002). The Columbia River fishery is currently managed through a joint Washington and Oregon accord to manage white sturgeon. Probably the most important regulation for protecting sturgeon was the introduction of slot limits starting in 1950 for both the sport and commercial fisheries. Beginning in 1950 and continuing through 1997–98 when the slot limits were last changed, they have become increasingly restrictive and protective of both green and white sturgeon. The Columbia River sturgeon fishery is currently operating under a March 2000 agreement covering a three-year period through 2002. The green sturgeon regulations under this agreement include: a recreational size limit of 42–60 inches (107–152 cm) with one fish per day and 10 fish per year bag limits, with barbless hooks required; a commercial size limit of 48–66 inches (122–168 cm); and no green sturgeon-only commercial seasons (green sturgeon are only taken as bycatch during white sturgeon seasons, provided the green sturgeon catch does not exceed recent harvest levels). Commercial bycatch of green sturgeon occurs predominantly during the early fall (August) salmon and white sturgeon fisheries, when the green sturgeon have migrated into the estuary and lower mainstem of the Columbia River.

In 2001, sturgeon retention was prohibited during the early-fall target chinook commercial season after the preseason catch expectation for white sturgeon was exceeded in early August. Sturgeon retention was prohibited in