NATIONAL MARINE FISHERIES SERVICE
ENDANGERED SPECIES ACT
BIOLOGICAL OPINION

Agency: U.S. Army Corps of Engineers – New England District

Activity Considered: Maintenance Dredging of Bath Iron Works Sinking Basin, Kennebec River, Maine
F/NER/2003/01220

Conducted by: National Marine Fisheries Service
Northeast Region

Date Issued: _____

Approved by: _____

This constitutes the National Marine Fisheries Service's (NOAA Fisheries) biological opinion on the effects of the Army Corps of Engineers (ACOE) New England District's approval of a permit for maintenance dredging of the Sinking Basin at the Bath Iron Works facility in the Kennebec River, ME on threatened and endangered species in accordance with Section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 et seq.). This biological opinion (BO) is based on information provided in the NOAA Fisheries August 28, 1997 BO on dredging in the Kennebec River Federal Navigation Channel, the November 29, 2000 amendment to the 1997 BO, the April 16, 2002 BO on the dredging of the Kennebec River Federal Navigational Channel, correspondence with Mr. William Kavanaugh and Mr. Jay Clement of the ACOE, and other sources of information. A complete administrative record of this consultation will be kept at the NOAA Fisheries Northeast Regional Office. Formal consultation was initiated on September 19, 2003.

CONSULTATION HISTORY

In 2000, Bath Iron Works Corporation (BIW) took delivery of a dry dock. Vessels on the dry dock must be brought to the sinking basin where the dry dock is sunk so that the vessels are able to float off the dry dock. The sinking basin for the dry dock is in the middle of the Kennebec River and is a 550,000 square foot area adjacent to the BIW shipbuilding facility. When originally constructed, BIW felt that the sinking basin hole would be self-scouring and would not require frequent dredging. In September 2001, the dry dock was not able to sink to design depths (-70' mean low water (MLW)). At that time it was not clear if sand came from a slump of the side walls or from infilling. Also in September 2001, dredging of the sinking basin was completed under a permit issued by the ACOE for the recently constructed Land Level Transfer Facility (LLTF). The LLTF was subject to informal Section 7 consultation which concluded with a letter dated June 10, 1998 transmitting the determination by NOAA Fisheries that the project, including dredge-fill operations, was not likely to adversely affect the federally endangered shortnose sturgeon (*Acipenser brevirostrum*) in the Kennebec River.

In January 2002, BIW submitted an application to the ACOE for annual dredging of the sinking basin. The permit authorized the dredging of approximately 10,000 cubic yards (cy) of sandy sediment annually over a ten-year period. Material was to be removed by a clam-shell bucket

dredge mounted on a barge and would be disposed of in an established disposal area in the Kennebec River, north of Bluff Head in approximately 98 feet of water. The permit allowed dredging to occur from November 1 – April 30 of each year.

In March 2002, the ACOE contacted NOAA Fisheries regarding the proposed permit for maintenance dredging of the sinking basin. At this time, NOAA Fisheries told the ACOE that shortnose sturgeon are known to be in the vicinity of the BIW facility year-round but that concentrations of shortnose sturgeon would be largest from the late spring to early fall. At this time there was no evidence that shortnose sturgeon would be adversely affected by mechanical dredging. Consultation was concluded informally as ACOE implemented a condition in the permit that restricted dredging to occur only from November 1 – April 30 of any year. At that time, NOAA Fisheries concurred with the ACOE's determination that shortnose sturgeon were not likely to be adversely affected by the dredging activities in the sinking basin.

On April 30, 2003, the ACOE contacted NOAA Fisheries to report that a shortnose sturgeon was killed by the mechanical dredge being used to dredge the sinking basin. This take was the first evidence of lethal interactions between shortnose sturgeon and mechanical dredges. When the take occurred, NOAA Fisheries told ACOE that any future dredging of the sinking basin with a mechanical dredge would require that consultation on this action be reinitiated. Federal agencies are required to reinitiate consultation when new information becomes available that was not considered in previous consultation. The April 30, 2003 take represents new information and it is appropriate to reinitiate consultation. In a conference call on September 5, 2003 between BIW staff, Jay Clement of the ACOE and Julie Crocker of NOAA Fisheries, BIW indicated that it would be necessary to dredge the sinking basin before February 2004 as there is a US Naval destroyer that needs to be launched from the dry dock at that time and that recent sounding data had indicated that the sinking basin did not have adequate depth for the ship to float off the dry dock. BIW staff indicated that the dredging of 10-20,000cy of material would provide enough depth for the launch of this destroyer. The dredging of 79,300cy of material would bring the sinking basin back to its design depth of 70 feet below MLW and ensure that no maintenance dredging would be required before 2007.

In a letter dated September 19, 2003, the ACOE requested reinitiation of consultation with NOAA Fisheries on the behalf of BIW to conduct the dredging necessary to bring the sinking basin back to design depth. Included with this letter were a description of the proposed action and a description of the April 30, 2003 take. In a letter dated October XX, 2003, NOAA Fisheries concurred with the need for formal consultation as this proposed activity is likely to affect shortnose sturgeon. As NOAA Fisheries had all the information necessary to initiate formal consultation, the date of the September 19, 2003 letter serves as the date of initiation of formal consultation.

DESCRIPTION OF THE PROPOSED ACTION

Maintenance Dredging

Maintenance dredging of the sinking basin area is necessary to allow deep draft vessels to be removed from the dry dock by sinking them into the sinking basin with adequate depth so that the vessels are able to float off the dry dock. Vessels serviced by BIW include U.S. Navy frigate, destroyer and cruiser class ships. Sand movement has caused the sinking basin to fill and

depths are not sufficient for the launch of a US Navy destroyer scheduled to depart BIW in February, 2004. Since taking delivery of the dry dock in 2000, the sinking basin has been dredged twice; dredging occurred in April 2002 and in April 2003.

Beginning in early November 2003, BIW proposes to dredge a total of approximately 79,300 cy of sand and silt from a 12.6 acre area to a depth of -70' MLW. The proposed work will take approximately 500-700 hours to complete (3-4 weeks at 24 hours/day or 6-7 weeks at 12 hours/day). All work is scheduled to be completed by February 2004. No future maintenance dredging is expected to be required until 2007 and as there is no indication of the volume of material that may need to be removed at that time, future maintenance dredging of the sinking basin will not be considered in this consultation. A mechanical clam-shell dredge mounted on a barge will be used for the dredging of the sinking basin. All material will be deposited into a scow on board the barge. The design of the sinking basin precludes the use of a hopper dredge and the use of a hopper dredge will not be considered in this consultation.

Disposal of Dredged Material
Historic sampling and testing has shown that the material to be removed is clean sand suitable for in-river or nearshore disposal. Material dredged from the sinking basin will be disposed of at the previously used in-river disposal area north of Bluff Head in approximately 95-100 feet of water.

Action Area
The action area for this consultation includes the sinking basin, the in-river disposal site near Bluff Head and the waters between and immediately adjacent to these areas.

STATUS OF AFFECTED SPECIES

This section will focus on the status of the species within the action area, summarizing information necessary to establish the environmental baseline and to assess the effects of the proposed action.

The only endangered or threatened species under NOAA Fisheries' jurisdiction in the action area is the endangered shortnose sturgeon (*Acipenser brevirostrum*). No critical habitat has been designated for shortnose sturgeon and therefore none will be affected by the proposed action.

Shortnose Sturgeon
Shortnose sturgeon were listed as endangered on March 11, 1967 (32 FR 4001), and the species remained on the endangered species list with the enactment of the ESA in 1973. A shortnose sturgeon recovery plan was published in December 1998 to promote the conservation and recovery of the species.

Although shortnose sturgeon are listed as endangered range-wide, in the final recovery plan NOAA Fisheries recognized 19 separate populations occurring throughout the range of the species. These populations are in New Brunswick Canada (1); Maine (2); Massachusetts (1); Connecticut (1); New York (1); New Jersey/Delaware (1); Maryland and Virginia (1); North Carolina (1); South Carolina (4); Georgia (4); and Florida (2). Although NOAA Fisheries has

not formally recognized distinct population segments (DPS)[1] of shortnose sturgeon under the ESA, based on the most recent reviews of the best scientific and commercial data on shortnose sturgeon and analyses of their population trends, and consistent with the 1998 Recovery Plan, NOAA Fisheries treats the nineteen recognized populations as subpopulations or recovery units whose survival and recovery is critical to the survival and recovery of the species. Any action that appreciably reduced the likelihood that one or more of these populations would survive and recover would appreciably reduce the species' likelihood of survival and recovery in the wild. Although genetic information within and among shortnose sturgeon occurring in different river systems is largely unknown, life history studies indicate that shortnose sturgeon populations from different river systems are substantially reproductively isolated (Kynard 1997) and, therefore, should be considered discrete. While genetic information may reveal that interbreeding does not occur between rivers that drain into a common estuary, at this time, such river systems are considered a single population compromised of breeding subpopulations (NOAA Fisheries 1998). In the recovery plan, NOAA Fisheries stated that loss of a single shortnose sturgeon population may risk the permanent loss of unique genetic information that is critical to the survival and recovery of the species and that, therefore, each shortnose sturgeon population should be managed as a DPS or recovery unit for the purposes of Section 7 of the ESA. Consequently, this BO will treat the nineteen separate populations of shortnose sturgeon as recovery units (one of which occurs in the action area) for the purposes of this analysis.

Shortnose sturgeon occur in large rivers along the western Atlantic coast from the St. Johns River, Florida (possibly extirpated from this system) to the Saint John River in New Brunswick, Canada. Shortnose sturgeon are large, long lived fish species. The species is anadromous in the southern portion of its range (i.e., south of Chesapeake Bay), while northern populations are amphidromous (NOAA Fisheries 1998). Population sizes vary across the species' range. From available estimates, the smallest populations occur in the Cape Fear (~8 adults; Moser and Ross 1995) and Merrimack Rivers (~100 adults; M. Kieffer, United States Geological Survey, personal communication), while the largest populations are found in the Saint John (~100,000; Dadswell 1979) and Hudson Rivers (~61,000; Bain *et al.* 1998). No reliable estimate of the size of neither the total species nor the shortnose sturgeon population in the Northeastern United States exists. Shortnose sturgeon are benthic fish that mainly occupy the deep channel sections of large rivers. They feed on a variety of benthic and epibenthic invertebrates including molluscs, crustaceans (amphipods, chironomids, isopods), and oligochaete worms (Vladykov and Greeley 1963; Dadswell 1979 *in* NOAA Fisheries 1998). Shortnose sturgeon are long-lived (30-40 years) and, particularly in the northern extent of their range, mature at late ages. In the north, males reach maturity at 5 to 10 years, while females mature between 7 and 13 years.

Shortnose sturgeon have similar lengths at maturity (45-55 cm fork length) throughout their range, but, because sturgeon in southern rivers grow faster than those in northern rivers, southern sturgeon mature at younger ages (Dadswell *et al.* 1984). Shortnose sturgeon reach sexual maturity between approximately 6 and 10 years of age. Based on limited data, females spawn every three to five years while males spawn approximately every two years. The spawning

1 The definition of species under the ESA includes any subspecies of fish, wildlife, or plants, and any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature. To be considered a DPS, a population segment must meet two criteria under NOAA Fisheries policy. First, it must be discrete, or separated, from other populations of its species or subspecies. Second, it must be significant, or essential, to the long-term conservation status of its species or subspecies. This formal legal procedure to designate DPSs for shortnose sturgeon has not yet been completed.

period is estimated to last from a few days to several weeks. Spawning begins from late winter/early spring (southern rivers) to mid to late spring (northern rivers) when the freshwater temperatures increase to 8-9ºC. Several published reports have presented the problems facing long-lived species that delay sexual maturity (Crouse *et al.* 1987; Crowder *et al.* 1994; Crouse 1999). In general, these reports concluded that animals that delay sexual maturity and reproduction must have high annual survival as juveniles through adults to ensure that enough juveniles survive to reproductive maturity and then reproduce enough times to maintain stable population sizes.

Total instantaneous mortality rates (Z) are available for the Saint John River (0.12 - 0.15; ages 14-55; Dadswell 1979), Upper Connecticut River (0.12; Taubert 1980b), and Pee Dee-Winyah River (0.08-0.12; Dadswell *et al.* 1984). Total instantaneous natural mortality (M) for shortnose sturgeon in the lower Connecticut River was estimated to be 0.13 (T. Savoy, Connecticut Department of Environmental Protection, personal communication). There is no recruitment information available for shortnose sturgeon because there are no commercial fisheries for the species. Estimates of annual egg production for this species are difficult to calculate because females do not spawn every year (Dadswell *et al.* 1984). Further, females may abort spawning attempts, possibly due to interrupted migrations or unsuitable environmental conditions (NOAA Fisheries 1998). Thus, annual egg production is likely to vary greatly in this species.

At hatching, shortnose sturgeon are blackish-colored, 7-11mm long and resemble tadpoles (Buckley and Kynard 1981). In 9-12 days, the yolk sac is absorbed and the sturgeon develops into larvae which are about 15mm total length (TL; Buckley and Kynard 1981). Sturgeon larvae are believed to begin downstream migrations at about 20mm TL. Laboratory studies suggest that young sturgeon move downstream in a 2-step migration; a 2-day migration by larvae followed by a residency period by young of the year (YOY), then a resumption of migration by yearlings in the second summer of life (Kynard 1997). Juvenile shortnose sturgeon (3-10 years old) reside in the interface between saltwater and freshwater in most rivers (NOAA Fisheries 1998).

In populations that have free access to the total length of a river (e.g., no dams within the species' range in a river: Saint John, Kennebec, Altamaha, Savannah, Delaware and Merrimack Rivers), spawning areas are located at the farthest upstream reach of the river (NOAA Fisheries 1998). Sturgeon spawn in upper, freshwater areas and feed and overwinter in both fresh and saline habitats. Shortnose sturgeon spawning migrations are characterized by rapid, directed and often extensive upstream movement (NOAA Fisheries 1998). Shortnose sturgeon typically leave the spawning grounds soon after spawning. Non-spawning movements include wandering movements in summer and winter (Dadswell *et al.* 1984, Buckley and Kynard 1985, O'Herron *et al.* 1993). Kieffer and Kynard (1993) reported that post-spawning migrations were correlated with increasing spring water temperature and river discharge.

Juvenile shortnose sturgeon generally move upstream in spring and summer and move back downstream in fall and winter; however, these movements usually occur in the region above the saltwater/freshwater interface (Dadswell *et al.* 1984, Hall *et al.* 1991). The species appears to be estuarine anadromous in the southern part of its range, but in some northern rivers, it is "freshwater amphidromous" (i.e., adults spawn in freshwater but regularly enter saltwater habitats throughout their life; Kieffer and Kynard 1993). Adult sturgeon occurring in freshwater or freshwater/tidal reaches of rivers in summer and winter often occupy only a few short reaches

of the total length (Buckley and Kynard 1985). Summer concentration areas in southern rivers are cool, deep, thermal refugia, where adult and juvenile shortnose sturgeon congregate (Flourney *et al.* 1992, Rogers and Weber 1994, Rogers and Weber 1995, Weber 1996). While shortnose sturgeon are occasionally collected near the mouths of rivers and often spend time in estuaries, they are not known to participate in coastal migrations (Dadswell *et al.* 1984).

In the northern extent of their range, shortnose sturgeon exhibit three distinct movement patterns. These migratory movements are associated with spawning, feeding, and overwintering activities. In spring, as water temperatures rise above 8ºC, pre-spawning shortnose sturgeon move from overwintering grounds to spawning areas. Spawning occurs from mid/late March to mid/late May depending upon location. In populations that have free access to the total length of a river (e.g., no dams within the species' range in a river: Saint John, Kennebec, Altamaha, Savannah, Delaware, and Merrimack Rivers), spawning areas are located at the farthest accessible upstream reach of the river, often just below the fall line (NOAA Fisheries 1998). Shortnose sturgeon spawn in upper, freshwater sections of rivers and feed and overwinter in both fresh and saline habitats. Shortnose sturgeon are believed to spawn at discrete sites within the river (Kieffer and Kynard 1996). In the Merrimack River, males returned to only one reach during the four years of the telemetry study (Kieffer and Kynard 1996). Squires (1982) found that during the three years of the study in the Androscoggin River, adults returned to a 1-km reach below the Brunswick Dam and Kieffer and Kynard (1996) found that adults spawned within a 2-km reach in the Connecticut River for three consecutive years. Spawning occurs over channel habitats containing gravel, rubble, or rock-cobble substrates (Dadswell *et al.* 1984; NOAA Fisheries 1998). Additional environmental conditions associated with spawning activity include decreasing river discharge following the peak spring freshet, water temperatures ranging from 8 - 12º C, and bottom water velocities of 0.4 to 0.7 m/sec (Dadswell *et al.* 1984; NOAA Fisheries 1998). The eggs are separate when spawned but become adhesive within approximately 20 minutes of fertilization (Dadswell *et al.* 1984). Between 8° and 12°C, eggs generally hatch after approximately 13 days. The larvae are photonegative, remaining on the bottom for several days. Buckley and Kynard (1981) found week old larvae to be photonegative and form aggregations with other larvae in concealment.

Adult shortnose sturgeon typically leave the spawning grounds soon after spawning. Non-spawning movements include rapid, directed post-spawning movements to downstream feeding areas in spring and localized, wandering movements in summer and winter (Dadswell *et al.* 1984; Buckley and Kynard 1985; O'Herron *et al.* 1993). Kieffer and Kynard (1993) reported that post-spawning migrations were correlated with increasing spring water temperature and river discharge. Young-of-the-year shortnose sturgeon are believed to move downstream after hatching (Dovel 1981) but remain within freshwater habitats. Older juveniles tend to move downstream in fall and winter as water temperatures decline and the salt wedge recedes. Juveniles move upstream in spring and feed mostly in freshwater reaches during summer.

The temperature preference for shortnose sturgeon is not known (Dadswell *et al.* 1984) but shortnose sturgeon have been found in waters with temperatures as low as 2 to 3ºC (Dadswell *et al.* 1984) and as high as 34ºC (Heidt and Gilbert 1978). However, temperatures above 28ºC are thought to adversely affect shortnose sturgeon. In the Atlamaha River, temperatures of 28-30ºC during summer months create unsuitable conditions and shortnose sturgeon are found in deep cool water refuges.

Shortnose sturgeon are also known to occur at a wide range of depths. A minimum depth of 0.6m is necessary for the unimpeded swimming by adults. Shortnose sturgeon are known to occur at depths of up to 30m but are generally found in waters less than 20m (Dadswell *et al.* 1984, Dadswell 1979). Shortnose sturgeon have also demonstrated tolerance to a wide range of salinities. Shortnose sturgeon have been documented in freshwater (Taubert 1980, Taubert and Dadswell 1980) and in waters with salinity of 30 parts-per-thousand (ppt) (Holland and Yeverton 1973, Saunders and Smith 1978). Mcleave *et al.* (1977) reported adults moving freely through a wide range of salinities, crossing waters with differences of up to 10ppt within a two hour period. The tolerance of shortnose sturgeon to increasing salinity is thought to increase with age (Kynard 1996). Shortnose sturgeon typically occur in the deepest parts of rivers or estuaries where suitable oxygen and salinity values are present (Gilbert 1989).

The Shortnose Sturgeon Recovery Plan (NOAA Fisheries 1998) identifies habitat degradation or loss (resulting, for example, from dams, bridge construction, channel dredging, and pollutant discharges) and mortality (resulting, for example, from impingement on cooling water intake screens, dredging and incidental capture in other fisheries) as principal threats to the species' survival. The recovery goal is identified as delisting shortnose sturgeon populations throughout their range, and the recovery objective is to ensure that a minimum population size is provided such that genetic diversity is maintained and extinction is avoided.

Status of Shortnose Sturgeon in the Kennebec River

The NOAA Fisheries recovery plan indicates that shortnose sturgeon occur in the estuarine complex formed by the Sheepscot, Kennebec, and Androscoggin rivers. Sturgeon were tagged with Carlin tags from 1977 to 1980, with recoveries in each of the following years. A Schnabel estimate of 7,222 adults was computed and is considered the most reliable estimate of population size for the combined estuarine complex (NOAA Fisheries 1998). Tracking studies to delineate spawning habitat were performed on the Androscoggin River during 1993. Gill nets were used to capture study animals and catch rates were recorded. Gill net catch-per-unit-effort during this study was the highest recorded in this area, suggesting that the population in the Androscoggin has increased since last surveyed. In 1999, the Edward's Dam, which represented the first significant impediment to the northward migration of shortnose sturgeon in the Kennebec River, was removed. With the removal of the dam, approximately 17 miles of previously inaccessible sturgeon habitat north of Augusta was made available. In May 2003, a shortnose sturgeon was observed at the base of the Edwards Dam, confirming that shortnose sturgeon may now be present in this area of the River. It is currently unknown whether spawning may now take place upstream of the former Edward's Dam location.

On September 19, 1994, NOAA Fisheries received a petition from the Edwards Manufacturing Company, Inc., to delist shortnose sturgeon occurring in the Androscoggin and Kennebec rivers. In the ensuing status review, NOAA Fisheries found that the petition to delist this population segment was not warranted because: 1) the population estimate used by the petitioners was less reliable than the best estimate accepted by NOAA Fisheries; 2) the best population estimate available did not exceed the interim threshold at which the population segment would be a candidate for delisting; 3) no recent information was available to assess the population dynamics; and 4) threats to shortnose sturgeon habitat still exist throughout the Androscoggin and Kennebec rivers (NOAA Fisheries 1996).

In the Kennebec River, movement to the spawning grounds occurs in early spring (April - May). Spawning sites have been identified near Gardiner in the Kennebec River, in the Androscoggin River, and may also occur in the Cathance River. In 1993, Maine DMR confirmed the exact location of the spawning sites in the Androscoggin River and determined that both adult and larval sturgeon use the region below the Brunswick Dam. Movement to the spawning areas is triggered by water temperature and fish arrive at the spawning locations when water temperatures are between 6-8 ºC. Shortnose sturgeon quickly leave the spawning grounds for summer foraging areas when temperatures exceed 15ºC (Squiers et al. 1982).

Summer foraging areas have been identified in the Sasanoa River entrance and in the mainstem of the Kennebec River below Bath. Between June and September, shortnose sturgeon forage in shallow waters of mud flats that are covered with rooted aquatic plants. The vegetation provides many plant surfaces for the preferred food items of sturgeon including benthic crustaceans, molluscs, and insects. In the summer months, concentrations of shortnose sturgeon have also been known to move up into the freshwater reaches of the Kennebec River and foraging shortnose sturgeon have also been seen in Montsweag Bay in the Sheepscot River, which is located near the eastern end of the Sasanoa River (NOAA Fisheries 1996).

Squiers (1982) reported that during 1979, concentrations of shortnose sturgeon were in the lower estuary below Bath during summer; in 1980 and 1981 large concentrations were found in the mid-estuary in the Bath region, most likely utilizing the abundant food resources in the Sasanoa River entrance. Subsequent tracking and trawl data from 1996-1999 indicate that shortnose sturgeon may be found in this area from at least late March through the beginning of December. Studies indicate that at least a portion of the shortnose sturgeon population in the Kennebec River overwinters in Merrymeeting Bay (just north of the proposed dredge area at BIW and north of the disposal area near Bluff Head). The seasonal migrations of shortnose sturgeon are believed to be correlated with changes in water temperature. In 1999, when the tracking study was performed, the water temperature near BIW reached the 8-9º C threshold (believed to be the trigger prompting spawning fish to migrate to the spawning area) in mid April. Also during the tracking study, several fish presumed to be non-spawning sturgeon, were documented in the Chops Point and Swan Island areas (north of Doubling Point) in late March and then were found to have migrated south to the BIW region (e.g., north and south of the BIW Pier and Museum Point) early in April.

Until a study aimed at specifically determining overwintering locations was conducted by the Maine Department of Marine Resources (DMR) in 1996 for the Maine Department of Transportation (DOT), the sites thought to be the most likely overwintering sites were deep pools below Bluff Head, and possibly in adjacent estuaries such as the Sheepscot (Squiers and Robillard 1997). The 1996 study of overwintering activity suggests that at least one overwintering site is located above Bath. This is based on tracking 15 shortnose sturgeon collected and released in the vicinity of the Sasanoa River (Pleasant Cove), Winnegance Cove (near the Doubling Point reach), and Merrymeeting Bay (north of Bath and the Sasanoa River entrance). Tracking was done from October through January. Eleven of these fish were relocated in Merrymeeting Bay. Two of the fish from Pleasant Cove were never found in Merrymeeting Bay; one Pleasant Cove fish moved to Winnegance Cove and back to Pleasant Cove and another moved to Days Ferry (half way between Bath and Merrymeeting Bay). All of

the fish that continued to transmit after November were only found in upper Merrymeeting Bay on the east-side of Swan Island. This is consistent with the trends for movement of shortnose sturgeon in the Delaware River (O'Herron 1992). Overwintering sturgeon in the Delaware River are found in the area of Newbold Island, in the Trenton to Kinkora river reach, in an area geographically similar to the area around Swan Island.

Fisheries sampling was conducted from April 1997 through June 1998 by Normandeau Associates, using a semi-balloon otter trawl with 1 ½ inch mesh in the cod end and a ¼ inch liner. Sampling occurred monthly in April, May and December. At the request of NOAA Fisheries and Maine DMR, sampling frequency increased to twice monthly from June through November 1997 and April through June 1998. Trawl locations were located near the BIW outfitting pier (T1), south of the pier near the dry dock facility (T2), and south of Trufant Ledge (T3). In August, 1997 additional stations were added near Sasanoa Point (T4), Hanson Bay (T5), north of Hospital Point on the west (T6) and east (T7) shores, and in Winnegance Creek (T8). During high slack tide, two tows were made at each sampling location. Three of these sampling locations are in the vicinity of Doubling Point (T6, T7 and T8) (located approximately one nautical mile south of BIW). Trawl data indicate that no shortnose sturgeon were collected from Stations T6 or T7 between August 1997 and March 1998. One shortnose sturgeon was collected at Station T6 on April 1, 1998 and shortnose sturgeon were collected from Station T7 on April 1 and April 23, 1998. No shortnose sturgeon were collected in May or June 1998 at these stations. Several shortnose sturgeon were collected in August through October 1997 from Station T8 and one was captured on November 17, 1997. None were collected at this station from December 1997 through mid-May 1998. Three shortnose sturgeon were collected in late May 1998 and none were collected in June 1998.

Beginning in 1998, 17 shortnose sturgeon were collected via gillnet in the BIW area and were tagged and released near the capture site. Tracking began in 1998 and continued into 1999. Some of the fixed receivers were moved from their original locations and redeployed in areas of higher shortnose sturgeon abundance. In 1999, tracking was performed in three primary locations from late March through early May and mid-October through Mid-December. Through December 15, all scans detected shortnose sturgeon in the vicinity of BIW. From October 21 through November 4, 1999, seven shortnose sturgeon were detected ranging from North to South of the BIW Pier, Chops Point, Fishers Eddy, and Doubling Point. Five of these sturgeon were in the immediate vicinity of BIW. From November 4 through November 12, 1999, four tagged shortnose sturgeon were detected, three of which were in the immediate vicinity of BIW. Tagged shortnose sturgeon were also tracked in the vicinity of BIW from November 18 – 23, one of which was in the immediate vicinity of BIW. The tracks from November 23 – December 15 detected two shortnose sturgeon in the immediate vicinity of BIW. No tracking was attempted after December 15 due to icing conditions in the Kennebec River.

Based on tracking and trawl data, shortnose sturgeon are expected to be in the BIW area year round. Concentrations of shortnose sturgeon are expected to be highest from early April – mid December, with numbers being the highest in the summer months (Scott Farrel, Normandeau Associates, personal communication 2002).

Anthropogenic impacts

The major known sources of anthropogenic mortality and injury of shortnose sturgeon include

entrainment in dredges and entanglement in fishing gear. Injury and mortality can also occur at power plant cooling water intakes and structures associated with dams in rivers inhabited by this species. Shortnose sturgeon may also be adversely affected by habitat degradation or exclusion associated with riverine maintenance and construction activities and operation of power plants. Entanglement could include incidental catch in commercial or recreational gear as well as directed poaching activities. Shortnose sturgeon are most likely to interact with fisheries in and around the mouths of rivers where they are found. Thus, interactions are more likely to occur in state fisheries or unregulated fisheries than in the EEZ. Interactions are also most likely to occur during the spring migration (NOAA Fisheries 1998b). According to information summarized by NOAA Fisheries (1998b), operation of gillnet fisheries for shad may result in lethal takes of as many as 20 shortnose sturgeon per year in northern rivers. Shortnose sturgeon may be taken in ocean fisheries near rivers inhabited by this species. No comprehensive analysis of entanglement patterns is available at this time, in part due to the difficulty of distinguishing between shortnose and Atlantic sturgeon with the similarity in appearance of these two species. For example, several thousand pounds of "sturgeon" were reported taken in the squid/mackerel/butterfish fishery in 1992. However, this information is not broken down by species.

ENVIRONMENTAL BASELINE

Environmental baselines for biological opinions include the past and present impacts of all state, federal or private actions and other human activities in the action area, the anticipated impacts of all proposed federal projects in the action area that have already undergone formal or early Section 7 consultation, and the impact of state or private actions that are contemporaneous with the consultation in process (50 CFR 402.02). The environmental baseline for this biological opinion includes the effects of several activities that may affect the survival and recovery of the endangered species in the action area. The activities that shape the environmental baseline in the action area of this consultation generally include: dredging operations, water quality, scientific research, and fisheries, and recovery activities associated with reducing those impacts. An additional environmental impact to be addressed is the effects of discharges into the river on shortnose sturgeon.

Dredging

The construction and maintenance of Federal navigation channels and other maintenance dredging projects have been identified as a source of sturgeon mortality. The authorized Federal navigation project in the Kennebec River consists of a channel 27 feet deep at MLW and 500 feet wide extending about 13 miles upstream from the river mouth at Popham Beach to the city of Bath. About eight miles upstream of Bath, the Federal navigation project provides for a navigation channel 17 feet deep MLW and 150 feet wide along the east side of Swan Island for 14 miles to the city of Gardiner. An 18-foot deep MLW and 150 feet wide channel extends through the ledge at Lovejoy Narrows opposite the upper end of Swan Island. A training wall was built along the Beef Rock Shoal opposite the lower end of Swan Island and another training wall was built opposite South Gardiner. A secondary channel 12 feet deep and 100 feet wide was provided along the west-side of swan Island to Richmond, with the navigation channel deepening to 15 feet MLW near the upper end of Swan Island. A 16-foot deep MLW channel was provided at Gardiner. A channel 11 feet deep MLW and 150 feet wide extends seven miles to the upper limit of the Federal navigation project in Augusta.

The ACOE has been performing maintenance dredging at the Doubling Point and Popham Beach reaches in the Kennebec River Federal Navigation Channel since 1950 at approximately three-year intervals. These sites have been dredged a total of approximately 15 times since 1950. The most recent dredging occurred under an emergency permit in October 2003. The Doubling Point area is approximately one nautical mile south of BIW. Dredging has been performed using a hopper dredge and the amount of material removed has ranged from 4,707 cy to 108,830 cy. Disposal sites have historically been located in the river north of Bluff head in 95-100 feet of water and approximately 0.4 nautical miles south of Jackknife Ledge in depths of 40-50 feet. These disposal sites were last used in the 2003 dredging operations. Seasonal dredging restrictions, allowing operations to occur at the Doubling Point reach from September 15 to October 15 and from March 1 through April 30 and at the site at Popham Beach from November 1 through April 30, were implemented after informal consultations between ACOE and NOAA Fisheries were conducted in 1989 and again in 1991. These seasonal restrictions were changed due to new information on the distribution of shortnose sturgeon and formalized in the NOAA Fisheries 1997 biological opinion. The dredging window that was established in 1997 allowed dredging in both areas from November 1 through April 30. This window was subsequently amended in 2000 to December 1 to March 1 to reflect new information on the seasonal distribution of shortnose sturgeon in the vicinity of Doubling Point.

Despite the seasonal restrictions that have been imposed, dredging in the vicinity of Doubling Point may cause shortnose sturgeon displacement, injury and/or mortality, as well as affect foraging and migration behavior. In a BO dated April 16, 2002, the effects of maintenance dredging of the Federal Navigation Channel at Doubling Point and Popham Beach on shortnose sturgeon were assessed for the November 1 – April 30 time frame. Accompanying this BO was an ITS which authorized the annual incidental taking of 2 shortnose sturgeon at Doubling Point during December 1 – March 1 and a total of 4 shortnose sturgeon in the November 1 – November 30 or March 2 – April 30 time frame. Maintenance dredging of these reaches was performed in April 2002. No incidental takes were observed during that dredge cycle. Due to emergency conditions, the Doubling Point and Popham Beach reaches were dredged most recently in October 2003. During this dredge operation, five shortnose sturgeon were taken by a hopper dredge in the Doubling Point reach. Dredging occurred over the course of four days. Two of the takes were lethal with two of the additional takes accounting for shortnose sturgeon with significant injuries. The fifth fish was released with minor injuries.

Contaminants and Water Quality

Contaminants including heavy metals, polychlorinated aromatic hydrocarbons (PAHs), pesticides, and polychlorinated biphenyls (PCBs), can have serious, deleterious effects on aquatic life and are associated with the production of acute lesions, growth retardation, and reproductive impairment (Ruelle and Keenlyne 1993). Contaminants introduced into the water column or through the food chain, eventually become associated with the benthos where bottom dwelling species like shortnose sturgeon are particularly vulnerable.

Several characteristics of shortnose sturgeon life history including long life span, extended residence in estuarine habitats, and being a benthic omnivore, predispose this species to long term, repeated exposure to environmental contaminants and bioaccumulation of toxicants (Dadswell 1979). In the Connecticut River, coal tar leachate was suspected of impairing

sturgeon reproductive success. Kocan (1993) conducted a laboratory study to investigate the survival of sturgeon eggs and larvae exposed to PAHs, a by-product of coal distillation. Only approximately 5% of sturgeon embryos and larvae survived after 18 days of exposure to Connecticut River coal-tar (i.e., PAH) demonstrating that contaminated sediment is toxic to shortnose sturgeon embryos and larvae under laboratory exposure conditions (NOAA Fisheries 1998).

Although there is scant information available on the levels of contaminants in shortnose sturgeon tissues, some research on other related species indicates that concern about the effects of contaminants on the health of sturgeon populations is warranted. Detectable levels of chlordane, DDE (1,1-dichloro-2, 2-bis(p-chlorophenyl)ethylene), DDT (dichlorodiphenyl-trichloroethane), and dieldrin, and elevated levels of PCBs, cadmium, mercury, and selenium were found in pallid sturgeon tissue from the Missouri River (Ruelle and Henry 1994). These compounds were found in high enough levels to suggest they may be causing reproductive failure and/or increased physiological stress (Ruelle and Henry 1994). In addition to compiling data on contaminant levels, Ruelle and Henry (1994) also determined that heavy metals and organochlorine compounds (i.e., PCBs) accumulate in fat tissues. Although the long term effects of the accumulation of contaminants in fat tissues is not yet known, some speculate that lipophilic toxins could be transferred to eggs and potentially inhibit egg viability. PCBs may also contribute to a decreased immunity to fin rot. In other fish species, reproductive impairment, reduced egg viability, and reduced survival of larval fish are associated with elevated levels of environmental contaminants including chlorinated hydrocarbons. A strong correlation that has been made between fish weight, fish fork length, and DDE concentration in pallid sturgeon livers indicates that DDE increase proportionally with fish size (NOAA Fisheries 1998).

Point source discharges (i.e., municipal wastewater, paper mill effluent, industrial or power plant cooling water or waste water) and compounds associated with discharges (i.e., metals, dioxins, dissolved solids, phenols, and hydrocarbons) contribute to poor water quality and may also impact the health of sturgeon populations. The compounds associated with discharges can alter the pH or receiving waters, which may lead to mortality, changes in fish behavior, deformations, and reduced egg production and survival.

The ACOE performed grain size analysis of the dredged material from Doubling Point in 1971, 1977, 1979, 1986, 1988, 1989, 1991, and 1995. The results of this testing has always shown the material to be sand, usually medium or medium to fine grained; sometimes with traces of silt and/or gravel. This material is believed to be a result of the current scour that prohibits settling of fine-grained silts and clays. Chemical analyses were not performed on the dredged material as sediments containing more than 15% fines (silt/clay) were absent. Chemical contaminants are not expected to adsorb to the coarse particles and the well-scoured nature of the substrate would disallow any significant chemical buildup. In addition, it is the ACOE's contention that there are no significant sources of pollutants located in the vicinity of the proposed dredging.

Scientific Studies

There have been limited studies targeting the shortnose sturgeon population present in the Kennebec River and estuarine complex – tracking studies in 1993 for spawning habitat; studies performed by Squiers et al. in 1979, 1980, and 1981; tracking by Squiers et al. to delineate overwintering locations in 1996; a trawl survey by Normandeau Associates from 1997-1998; and

a tracking survey by Normandeau Associates from 1998-1999. As a result of techniques associated with these sampling studies, shortnose sturgeon have been subjected to capturing, handling, and tagging. It is possible that research in the action area may have influenced and/or altered the migration patterns, reproductive success, foraging behavior, and survival of shortnose sturgeon.

Fisheries
Unauthorized take of shortnose sturgeon is prohibited by the ESA. However, shortnose sturgeon are taken incidentally in other anadromous fisheries along the East Coast and may be targeted by poachers (NOAA Fisheries 1998). The Kennebec River is an important corridor for migratory movements of various species including alewife (*Alosa pseudohernegus*), American eel (*Anguilla rostrata*), Atlantic sturgeon (*Acipenser oxyrhynchus*), blueback herring (*Alosa aestivalis*), American shad (*Alosa sapidissima*), rainbow smelt (*Osmerus mordax*), striped bass (*Morone saxatilis*) and lobster (*Homarus americanus*). Historically, the river and its tributaries supported the largest commercial fishery for shad in the State of Maine. However, pollution and the construction of dams decimated the shad runs in the late 1920's and early 1930's. Shortnose sturgeon in the Kennebec River may have been taken as bycatch in the shad fishery or other fisheries active in the action area. However, the incidental take of shortnose sturgeon in the river has not been well documented due to confusion over distinguishing between Atlantic sturgeon and shortnose sturgeon.

Cumulative threats from other federally regulated activities
Cumulative impacts from federal actions occurring in the Kennebec River have the potential to impact shortnose sturgeon. These include direct and indirect modification of habitat due to hydroelectric facilities and the introduction of pollutants from paper mills, sewers, and other industrial sources. Hydroelectric facilities can alter the river's natural flow pattern and temperatures and release of silt and other fine river sediments during dam maintenance can be deposited in sensitive spawning habitat nearby. Pollution has been a major problem for this river system, which continues to receive discharges from sewer treatment facilities and paper production facilities (metals, dioxin, dissolved solids, phenols, and hydrocarbons).

EFFECTS OF THE ACTION

This section of a biological opinion assesses the direct and indirect effects of the proposed action on threatened and endangered species or critical habitat, together with the effects of other activities that are interrelated or interdependent (50 CFR 402.02). Indirect effects are those that are caused later in time, but are still reasonably certain to occur. Interrelated actions are those that are part of a larger action and depend upon the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration (50 CFR 402.02).

Based on trawling data, dredge observer reports, and tracking data, shortnose sturgeon are expected to occur in the Bath region year round, with the largest numbers being present from mid-spring to early fall. Data indicate that some of the sturgeon that have been observed in the vicinity of the dredge site during the spring and fall may be moving between overwintering and summer areas. Based on the best available data, shortnose sturgeon are expected to be in the immediate vicinity of the BIW facilities, including the sinking basin, during the November 1 –

February 28 time period in which dredging is proposed to occur.

Interactions between shortnose sturgeon and dredge operations have been fairly well documented. Lethal takes of shortnose sturgeon have been documented in hopper dredge operations in the Delaware and Kennebec Rivers. A mechanical bucket dredge will be used to perform the dredging in the sinking basin. While the impacts to shortnose sturgeon from mechanical bucket dredging are expected to be less than those from other types of dredges (e.g., hopper and hydraulic pipeline), the potential for taking shortnose sturgeon with this type of dredge exists. An Atlantic sturgeon was killed in the Cape Fear River in a bucket and barge operation (NOAA Fisheries 1998) and an Atlantic sturgeon was captured in a clamshell bucket, deposited in the dredge scow, and released apparently unharmed during dredging operations at BIW in 2001 (Maine DMR 2002). While Atlantic sturgeon and shortnose sturgeon are not the same species, they are of similar body type and juvenile and smaller adult Atlantic sturgeon can be the same approximate size as shortnose sturgeon. Therefore, effects from dredging operations on the two species are thought to be comparable. On April 30, 2003, a clam-shell bucket dredge operating in the BIW sinking basin lethally took a shortnose sturgeon. Documentation of the incident reveals that the fish was nearly cut in half.

As shortnose sturgeon are known to be present in the immediate vicinity of BIW and throughout the action area year round, take of adults during dredging operations at the sinking basin is possible. However, the number of fish that are expected to be present during the fall and winter is less than the number of fish that are expected during the summer, when large concentrations of adult fish are actively foraging in the region. Based on tracking and trawl data in the BIW area (see pages 7-10), fewer shortnose sturgeon are expected to be in the sinking basin area from mid-December through early April. Therefore, it is reasonable to assume that the impacts to shortnose sturgeon from dredging of the sinking basin from November 1 through December 15 will be greater than those expected as a result of dredging from December 16 – February 28 as more shortnose sturgeon are expected to be present in the November 1 – December 15 time frame.

In addition to direct effects (injury and/or mortality), dredging operations have the potential to disrupt migratory behaviors. Based on data from the Kennebec River, the dredging operations at the sinking basin may have the potential to disrupt the migratory behavior of adults migrating to one of several suspected overwintering sites north and south of the action area. The likelihood of this disruption occurring is highest in November when many shortnose sturgeon are expected to be migrating to the overwintering areas. However, the dredge operations are occurring in a concentrated area in the middle of the Kennebec River and shortnose sturgeon are expected to be able to migrate past the dredge operation in either an upstream or downstream direction. While migrating shortnose sturgeon may be disrupted (delayed or temporarily change direction) by the dredging operations, the dredging is not expected to significantly impair the ability of shortnose sturgeon to complete essential migratory behaviors.

While dredging and disposal can have a definite impact on benthic resources, there is no data to indicate that the sinking basin area is a foraging area for shortnose sturgeon. In fact, current velocities are quite high, which is what causes the shoaling problem. This, along with the frequent presence of large vessels and frequent dredging, makes the sinking basin unlikely to be a significant foraging area. Shortnose sturgeon present in the Bath area in the summer months

are thought to be foraging near the entrance to the nearby Sasanoa River.

Dredging operations can also cause large amounts of sediment to be suspended in the water column. While increased sedimentation could impact shortnose sturgeon, the life stage most likely to be impacted by increased sedimentation are eggs and larvae. Due to the fact that the area to be dredged is several miles south of the known spawning areas and due to the time of year dredging will occur, no eggs and/or larvae are expected to be in the action area.

In addition to the release of sedimentation, dredging operations also have the potential to release contaminants that are present in the material to be dredged. However, the coarse nature of the material to be dredged, along with historical testing of the material, makes it unlikely that any contaminants would adhere to the sand particles (see page 12). Therefore, no release of contaminated material is expected.

Burial during disposal operations is another potential effect of dredging operations. Burial is probably most likely during the overwintering period when fish would be more lethargic and situated in deeper areas (such as disposal sites). Overwintering areas characteristically are areas of lower energy conditions, like deep pools, where the fish can expend less energy during a time period when they are not actively foraging. However, the above discussion on the location of shortnose sturgeon during the overwintering period suggests that concentrations of sturgeon would not be found at the dredge disposal site north of Bluff Head during the November through February time period. Furthermore, fish tracked during the fall and winter of 1997 and spring and fall of 1999 in the Doubling Point area, which is north of the disposal site, were making significant movements. Should these fish stray down river to the disposal site north of Bluff Head, they would be expected to be less susceptible to burial than overwintering fish because they would be more likely to actively avoid the area.

CUMULATIVE EFFECTS

Cumulative effects are defined in 50 CFR §402.02 as those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation.

Impacts to shortnose sturgeon from non-federal activities are unknown in this river. It is possible that occasional recreational and commercial fishing for anadromous fish species may result in incidental takes of shortnose sturgeon. However, positive identification and distinction between Atlantic sturgeon and shortnose sturgeon are difficult and therefore, historically, takes have not been quantified. Pollution from point and non-point sources has been a major problem in this river system, which continues to receive discharges from sewer treatment facilities and paper production facilities (metals, dioxin, dissolved solids, phenols, and hydrocarbons). Contaminants introduced into the water column or through the food chain, eventually become associated with the benthos where bottom dwelling species like shortnose sturgeon are particularly vulnerable.

INTEGRATION AND SYNTHESIS OF EFFECTS

The shortnose sturgeon is endangered throughout its entire range. The species exists as 19

separate populations that should be managed as such (NOAA Fisheries 1998). As indicated in the Recovery Plan (NOAA Fisheries 1998), the extinction of a single shortnose sturgeon population risks permanent loss of unique genetic information that is critical to the survival and recovery of the species. The shortnose sturgeon residing in the estuarine complex formed by the Kennebec, Androscoggin, and Sheepscot rivers form one of the 19 sturgeon populations.

Shortnose sturgeon in the action area may be adversely affected by the maintenance dredging in the sinking basin. Adult shortnose sturgeon are known to be present in the BIW area year round. An overwintering site for shortnose sturgeon has been identified in Merrymeeting Bay, which is six to nine nautical miles north of BIW. The region surrounding the project area has been identified as a summer foraging area for adult shortnose sturgeon. Tagged shortnose sturgeon have been tracked in the immediate vicinity of the BIW sinking basin throughout the month of November and into mid-December. While no tracking has occurred in the cold winter months due to icing conditions, shortnose sturgeon have been observed in the BIW area through the winter. As indicated by the data available, it is likely that adult shortnose sturgeon will be present in the action area during dredging operations and could be adversely affected.

Very little is known about the distribution and habitat use by juveniles in the Kennebec River, so assessment of impacts to this life stage is difficult. However, as shortnose sturgeon are known to spawn in both the Kennebec and Androscoggin Rivers, it is possible that juveniles could be present in the action area and thus could be adversely affected by dredging operations.

The presence of adults and/or juveniles in the action area during dredging operations could result in direct injury and/or mortality. Incidental take of sturgeon has been documented during other dredging operations involving bucket dredges. Shortnose sturgeon are likely to be injured or killed from entrapment in the bucket or burial in sediment during dredging and disposal. Sturgeon accidentally captured and/or emptied out of the bucket could suffer severe stress or injury, which could also lead to mortality. The take of the shortnose sturgeon by a bucket dredge at the sinking basin in April 2003 documents the lethal interactions that may occur in this area. This sturgeon was lethally injured as evidenced by the fact that the sturgeon was nearly cut in half.

The estimated population of adult shortnose sturgeon in the estuarine complex formed by the Sheepscot, Kennebec and Androscoggin Rivers is 7,222 individuals (NOAA Fisheries 1998). Very little is known about the juvenile population of shortnose sturgeon in the Kennebec. However, since the Bath region represents a significant summer foraging area for adults, it is possible that juvenile fish may also be found in the region. Numbers of shortnose sturgeon are expected to be highest from early April – mid December, with numbers being the highest in the summer months (Scott Farrel, Normandeau Associates, pers. communication 2002). Numbers of shortnose sturgeon found in the action area from November 1 – February 28 are expected to be significantly less than those found during warmer months and the number of shortnose sturgeon present from mid December through the end of February is likely to be less than from November 1 – December 15.

Since mechanical bucket dredges are capable of taking shortnose sturgeon, NOAA Fisheries believes that it is likely shortnose sturgeon will be taken during the maintenance dredging activities at the sinking basin. If all of the maintenance dredging of the BIW sinking basin were

conducted only from November 2003 through December 15, 2003, then NOAA Fisheries expects that the dredging is likely to take nine (9) shortnose sturgeon. This level of take is based on the occurrence of one shortnose sturgeon being killed in the dredging operations of the sinking basin in April 2003. In this operation, dredging occurred for 18 days with approximately 8500cy of material dredged (approximately 1/9 the amount of material to be dredged in the currently proposed project). An observer was on board during dredge operations, thus, the one mortality is expected to account for all take that may have occurred as a result of that dredging operation. The number of shortnose sturgeon in the action area from November – December 15 is expected to be the same as in April. If, however, maintenance dredging of the BIW sinking basin were to occur only from December 16, 2003 through February 28, 2004 then the dredging is likely to result in the take of fewer than 9 shortnose sturgeon because fewer shortnose sturgeon are expected in the action area during this later time frame.

This level of take should account for shortnose sturgeon that are injured or killed as well as those that may be captured in the dredge bucket but appear to be unharmed and are subsequently released. However, because NOAA Fisheries does not know exactly when the dredging will occur between November, 2003 and the end of February 2004, to estimate the effects of the action, NOAA Fisheries will assume the worst case scenario – that dredging will occur before December 16 when more shortnose sturgeon are expected to be in the action area than in the latter part of the time frame. Therefore, during the complete dredge cycle, November through February, no more than 9 shortnose sturgeon are authorized to be taken by this Incidental Take Statement. This take level was estimated based on the likelihood of the presence of shortnose sturgeon in the sinking basin area during this time period and previous information on take of shortnose sturgeon for a certain amount of dredged material.

It is possible that not all shortnose sturgeon taken by the dredge operations will be injured or killed. During dredging operations at BIW in June, 2002, one Atlantic sturgeon was recovered from the dredge bucket and released apparently unharmed. However, the level of incidental take is set to account for both lethal and non-lethal interactions, and any shortnose sturgeon taken, even if released apparently unharmed, will count towards the authorized take level.

The number of shortnose sturgeon that may be directly affected by the proposed action (maximum of 9) are a relatively small percentage of the total Kennebec River population (approximately 0.001%). There are no significant indirect effects expected as a result of this action.

CONCLUSION

Based on the evaluation of current information on the Kennebec River shortnose sturgeon population, and considering that shortnose sturgeon are known to be in the vicinity of BIW year-round, NOAA Fisheries concludes that maintenance dredging in this area from November 1 – February 28 is likely to adversely affect shortnose sturgeon. However, NOAA Fisheries believes that the dredging of the BIW sinking basin will not reduce the reproduction, numbers and distribution of the Kennebec River shortnose sturgeon population in a way that appreciably reduces their likelihood of survival and recovery in the wild. It is the opinion of NOAA Fisheries that maintenance dredging of the sinking basin at BIW between November 2003 and February 28, 2004 may adversely affect but is not likely to jeopardize the continued existence of

neither the Kennebec River shortnose sturgeon population nor the species as a whole. This determination is based on the small number of shortnose sturgeon expected to be affected by this action. The number of shortnose sturgeon expected to be directly affected by the action represent a relatively small percentage of the Kennebec River population and the species as a whole. This conclusion is also based on the lack of any significant indirect effects expected as a result of this project.

INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. NOAA Fisheries interprets the term "harm" as an act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding or sheltering (50 CFR §222.102). Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited under the ESA provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary and must be undertaken by the ACOE so that they become binding conditions for the exemption in section 7(o)(2) to apply. The ACOE has a continuing duty to regulate the activity covered by this Incidental Take Statement. If the ACOE (1) fails to assume and implement the terms and conditions or (2) fails to adhere to the terms and conditions of the Incidental Take Statement through enforceable terms, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the ACOE must report the progress of the action and its impact on the species to the NOAA Fisheries as specified in the Incidental Take Statement [50 CFR §402.14(I)(3)].

If all of the maintenance dredging of the BIW sinking basin were conducted only from November 2003 through December 15, 2003, then NOAA Fisheries anticipates that the dredging is likely to take nine (9) shortnose sturgeon. This level of take is based on the occurrence of one shortnose sturgeon being killed in the dredging operations of the sinking basin in April 2003. In this operation, dredging occurred for 18 days with approximately 8500cy of material dredged (approximately 1/9 the amount of material to be dredged in the currently proposed project). An observer was on board during dredge operations, thus, the one mortality is expected to account for all take that may have occurred as a result of that dredging operation. The number of shortnose sturgeon in the action area from November – December 15 is expected to be the same as in April. If, however, maintenance dredging of the BIW sinking basin were to occur only from December 16, 2003 through February 28, 2004 then the dredging is likely to result in the take of fewer than 9 shortnose sturgeon because fewer shortnose sturgeon are expected in the action area during this later time frame.

This level of take should account for shortnose sturgeon that are injured or killed as well as those that may be captured in the dredge bucket but appear to be unharmed and are subsequently

released. However, because NOAA Fisheries does not know exactly when the dredging will occur between November 2003 and the end of February 2004, to estimate the effects of the action, NOAA Fisheries will assume the worst case scenario – that dredging will occur before December 16 when more shortnose sturgeon are expected to be in the action area than in the latter part of the time frame. Therefore, during the complete dredge cycle, November through February, no more than 9 shortnose sturgeon are authorized to be taken by this Incidental Take Statement. This take level was estimated based on the likelihood of the presence of shortnose sturgeon in the sinking basin area during this time period and previous information on take of shortnose sturgeon for a certain amount of dredged material.

It is possible that not all shortnose sturgeon taken by the dredge operations will be injured or killed. During dredging operations at BIW in June, 2002, one Atlantic sturgeon was recovered from the dredge bucket and released apparently unharmed. However, the level of incidental take is set to account for both lethal and non-lethal interactions, and any shortnose sturgeon taken, even if released apparently unharmed, will count towards the authorized take level.

NOAA Fisheries believes this level of incidental take is reasonable given the seasonal distribution and abundance of adult shortnose sturgeon in the immediate project area, the level of take historically in the action area, and the level of Atlantic sturgeon take in similar dredging projects. In the accompanying biological opinion, NOAA Fisheries determined that this level of anticipated take is not likely to result in jeopardy to the species.

The following reasonable and prudent measures and terms and conditions must be implemented to validate this incidental take statement.

(1) ACOE must contact Julie Crocker by email (julie.crocker@noaa.gov) or phone (978) 281- 9328 ext.6530 at least 24-hours before dredging commences and within 24-hours of the completion of dredging activity.

(2) During all dredging and disposal operations in the sinking basin, a trained NOAA Fisheries-approved observer must be present on board the barge for the duration of the project. The ACOE must adhere to the attached "Monitoring Specifications for Mechanical Dredges" with trained NOAA Fisheries-approved observers, in accordance with the attached "Observer Protocol" and "Observer Criteria" (Appendix B). This includes submitting a final report once dredging activities are completed.

(3) If any whole shortnose sturgeon (alive or dead) or sturgeon parts are taken incidental to the project, ACOE must contact Julie Crocker (978) 281-9328 ext.6530 or Pat Scida (978) 281-9208 **within 24 hours** of the take. An incident report for shortnose sturgeon take (Appendix C) must also be completed by the observer and sent to Julie Crocker via FAX (978) 281-9394 within 24 hours of the take. Every incidental take (alive or dead) should be photographed and measured, if possible.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the

purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. NOAA Fisheries has determined that, as long as the seasonal restrictions are followed, the maintenance dredging in the Kennebec River Federal Navigation Channel is not likely to jeopardize the continued existence of endangered shortnose sturgeon located in the vicinity of the project area. To further reduce the adverse effects of the dredging on listed species, NOAA Fisheries recommends that ACOE implement the following conservation recommendations.

(1) Population information on certain life stages is still sparse for this river system. The ACOE should support further studies to evaluate habitat and the use of the river, in general, by juveniles.

(2) If any lethal take occurs, the NOAA Fisheries-approved observer should take fin clips (according to the procedure outlined in Appendix D) to be returned to NOAA Fisheries for ongoing analysis of the genetic composition of the Kennebec River shortnose sturgeon population.

REINITIATION OF CONSULTATION

This concludes formal consultation on the maintenance dredging of the BIW sinking basin. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of taking specified in the incidental take statement is exceeded; (2) new information reveals effects of the action that may not have been previously considered; (3) the identified action is subsequently modified in a manner that causes an effect to listed species; or (4) a new species is listed or critical habitat designated that may be affected by the identified action. In instances where the amount or extent of incidental take is exceeded, Section 7 consultation must be reinitiated immediately.

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APPENDIX A

Map of Project Location

APPENDIX B.

MONITORING SPECIFICATIONS FOR MECHANICAL DREDGES

I. EQUIPMENT SPECIFICATIONS

A. Floodlights

Floodlights must be installed to allow the NOAA Fisheries-approved observer to safely observe and monitor dredge bucket and scow.

B. Intervals between dredging

Sufficient time must be allotted between each dredging cycle for the NOAA Fisheries-approved observer to inspect the dredge bucket and scow for shortnose sturgeon and/or sturgeon parts and document the findings.

II. OBSERVER PROTOCOL

A. Basic Requirement

A NOAA Fisheries-approved observer with demonstrated ability to identify shortnose sturgeon must be placed aboard the dredge(s) being used; starting immediately upon project commencement to monitor for the presence of listed species and/or parts being taken or present in the vicinity of dredge operations.

B. Duty Cycle

Two NOAA Fisheries-approved observers must be onboard during dredging until the project is completed. While onboard, observers shall provide the required inspection coverage on a rotating basis of six hours on and six hours off each day to provide 100% coverage of all dredge-cycles.

C. Inspection of Dredge Spoils

During the required inspection coverage, the trained NOAA Fisheries-approved observer shall observe the bucket as it comes out of the water and as the load is deposited into the scow during each dredge cycle for evidence of shortnose sturgeon. If any whole shortnose sturgeon (alive or dead) or shortnose sturgeon parts are taken incidental to the project(s), Julie Crocker (978) 281-9328 ext.6530 or Pat Scida (978) 281-9208 must be contacted **within 24 hours** of the take. An incident report for shortnose sturgeon take (Appendix C) shall also be completed by the observer and sent to Julie Crocker via FAX (978) 281-9394 within 24 hours of the take. Incident reports shall be completed for every take regardless of the state of decomposition. Every incidental take (alive or dead, decomposed or fresh) should be photographed. A final report including all

completed load sheets, photographs, and relevant incident reports are to be submitted to the attention of Julie Crocker, NOAA Fisheries, Protected Resources Division, One Blackburn Drive, Gloucester, MA 01930-2298.

D. Inspection of Disposal

The trained NOAA Fisheries-approved observer shall observe all disposal operations to inspect for any whole shortnose sturgeon or sturgeon parts that may have been missed when the load was deposited into the scow. If any whole shortnose sturgeon (alive or dead) or shortnose sturgeon parts are observed during disposal operation, the procedure for notification and documentation outlined above should be completed.

E. Disposition of Parts

If any whole shortnose sturgeon (alive or dead, decomposed or fresh) or shortnose sturgeon parts are taken incidental to the project(s), Julie Crocker (978) 281-9328 ext.6530 or Pat Scida (978) 281-9208 must be contacted within 24 hours of the take. All whole dead shortnose sturgeon, or shortnose sturgeon parts should be photographed and described in detail on the Incident Report of Shortnose Sturgeon Take (Appendix C). The photographs and reports should be submitted to Julie Crocker, NOAA Fisheries, Protected Resources Division, One Blackburn Drive, Gloucester, MA 01930-2298. Disposition of dead shortnose sturgeon will be determined by NOAA Fisheries.

III. OBSERVER REQUIREMENTS

Submission of resumes of endangered species observer candidates to NOAA Fisheries for final approval ensures that the observers placed onboard the dredges are qualified to document takes of endangered and threatened species, to confirm that incidental take levels are not exceeded, and to provide expert advice on ways to avoid impacting endangered and threatened species. NOAA Fisheries does not offer certificates of approval for observers, but approves observers on a case-by-case basis.

A. Qualifications

Observers must be able to:

1) differentiate between shortnose (*Acipenser brevirostrum*) and Atlantic (*Acipenser oxyrinchus oxyrinchus*) sturgeon and their parts;

2) handle live sturgeon;

3) correctly measure the total length and width of live and whole dead sturgeon species;

B. Training

Ideally, the applicant will have educational background in biology, general experience aboard dredges, and hands-on field experience with the species of concern. For observer

candidates who do not have sufficient experience or educational background to gain immediate approval as endangered species observers, we note below the observer training necessary to be considered admissible by NOAA Fisheries. We can assist the ACOE by identifying groups or individuals capable of providing acceptable observer training. Therefore, at a minimum, observer training must include:

1) instruction on how to identify sturgeon and their parts;

2) instruction on appropriate screening on hopper dredges for the monitoring of sturgeon(whole or parts);

3) demonstration of the proper handling of live sturgeon incidentally captured during project operations;

4) instruction on standardized measurement methods for sturgeon lengths and widths; and

5) instruction on dredging operations and procedures, including safety precautions onboard.

Incident Report of Shortnose Sturgeon Take
Bath Iron Works Sinking Basin Maintenance Dredging Project

Species _____
Date _____ Time (specimen found) _____

Geographic Site _____
Location: Lat/Long_____
Vessel Name _____ Load #_____
Begin load time _____ End load time_____
Begin dump time _____ End dump time _____

Sampling method _____
Condition of screening _____
Location where specimen recovered_____
_____

Weather conditions_____
_____
Water temp: Surface _____ Below midwater (if known)_____

Species Information: *(please designate cm/m or inches.)*

Fork length (or total length) _____ Weight _____

Condition of specimen/description of animal
_____
_____

Fish Decomposed: NO SLIGHTLY MODERATELY SEVERELY

Fish tagged: YES / NO *Please record all tag numbers.* Tag # _____

Photograph attached: YES / NO
(please label *species, date, geographic site* and *vessel name* on back of photograph)

Comments/other (include justification on how species was identified)
_____
_____
_____
_____

Observer's Name _____
Observer's Signature _____

APPENDIX D

Procedure for obtaining fin clips from shortnose sturgeon for genetic analysis

Obtaining Sample

1. For any dead shortnose sturgeon, after the specimen has been measured and photographed, two one inch clips for the caudal fin shall be taken.

2. Each fin clip should be placed into a vial of 95% ethanol and the vial should be labeled with the species name, date, name of project and the fork length and total length of the fish along with a note identifying the fish to the appropriate observer report.

Storage of Sample

1. If it is not possible to immediately send the sample to NOAA Fisheries, the sample should be refrigerated or frozen.

Sending of Sample

1. All vials should be sealed with a lid and further secured with tape. Vials should be placed into Ziploc or similar resealable plastic bags. Vials should be then wrapped in bubble wrap or newspaper (to prevent breakage) and sent to:

   NOAA Fisheries
   Northeast Regional Office
   Protected Resources Division
   Attn: Endangered Species Coordinator
   One Blackburn Drive
   Gloucester, MA 01930

2. Upon sending a sample, contact Julie Crocker at (978) 281-9328 ext. 6530 or Pat Scida at (978) 281-9208 to inform NOAA Fisheries to expect a sample.