EXHIBIT No.

COM-01

PLAN FOR THE RESTORATION OF ANADROMOUS FISH TO THE NAUGATUCK RIVER, CONNECTICUT

State of Connecticut

Department of Environmental Protection
Fisheries Division

Introduction: The Naugatuck River historically supported anadromous fish runs but the record is sparse due to the early date of dam construction (and fish extermination). During the period from the mid-1700s to the mid-1900s, the river was subjected to a great deal of development including dam construction, water pollution, gravel dredging, stream channelization, floodplain encroachment, etc. Water pollution was so severe during the 1950s that surveys revealed few living organisms in the river. The Flood of 1955 caused a tremendous amount of damage to the valley and breached many dams. In subsequent years, industrial activity along the stream declined. Efforts to clean up the river began during the 1970s, accelerated during the 1980s, and continues to the presentday.

The Fisheries Division began longterm planning for fish restoration in 1987 when it provided input to the DEP/Water Management Bureau for the establishment of water quality standards. Preliminary fish habitat surveys were conducted. Public interest in the river, angling, and fish restoration heightened as the water became noticeably cleaner and trout stocking was resumed in certain reaches. As hydroelectrical developers sought federal licenses for projects, conditions were placed upon these licenses stipulating that the licensees provide fish passage at their projects when the DEP determines that the need exists.

Description of Watershed: The Naugatuck River flows north to south in the western portion of the state of Connecticut (Figures 1 and 2). The total length of the river is approximately 45 miles with a watershed area of 310 square miles. The river is formed by the confluence of its west and east branches near Torrington and enters the Housatonic River, as the latter's largest tributary, near the head-of-tide in the town of Derby. The watershed drains the western highlands of Connecticut and the valley is relatively steep and narrow. The river does not have

many large tributary streams. The most signicant tributaries (other than the east and west branches) are: Leadmine Brook, Hancock Brook, Steele Brook, Mad River, Hop Brook, and Little River. Major towns along the river include Torrington, Thomaston, Watertown, Waterbury, Naugatuck, Beacon Falls, Seymour, Ansonia, and Derby. Most of these towns are presently or formerly manufacturing/industrial centers that originated by utilizing the water power of the river. The production of brass products was the major industry along with the manufacture of things such as clocks.

Fish Species Targeted for Restoration:

AMERICAN SHAD (Alosa sapidissima)- Adult shad ascend the rivers of Connecticut in April through June. The juveniles descend the stream for the ocean during September - November of the same year. There is a remanent run of shad in the Housatonic River to the base of the Derby dam and to the Naugatuck River to the base of the Kinneytown dam. Shad is a popular game fish which is abundant in the Connecticut River to the east and once restored the species will support an intensive sport fishery in the Naugatuck River. Habitat surveys have revealed that the section of river between Seymour and the Thomaston Flood Control Dam contains habitat suitable for the spawning and production of American shad. If barriers to migration are removed, shad would be expected to migrate to the base of the Thomaston Flood Control Dam.

ALEWIFE (Alosa pseudoharengus)- Alewife is a closely-related species to the shad and is very similar in behavior and appearance except that the 12 inch long alewife is much smaller than the 20 inch shad. Adults ascend the rivers of Connecticut in March through May. The juveniles descend the stream for the ocean during July - September of the same year. There are alewife runs in many Connecticut streams and a remanent run exists at the base of the Kinneytown dam on the Naugatuck River. Although it can be caught on hook-and-line, the alewife is not a highly regarded game fish. Instead, people net it for use as bait in marine fisheries and, increasingly, as food fish. The alewife is a very important forage species on which striped bass, bluefish, and other economically-important fish prey. The restoration of alewife will not only benefit the Naugatuck River but also the Housatonic River estuary and Long Island Sound. Alewives do not ascend rivers as far inland as American shad and blueback herring and are projected to penetrate only as far upstream as Union City.

BLUEBACK HERRING (Alosa aestivalis)- Blueback herring is a closely related species to both the shad and alewife and is very difficult to distinguish from the alewife. Its spawning requirements and timing of migration are different from those of alewife. Blueback herring adults ascend the rivers of

Connecticut in April through June. The juveniles descend the stream for the ocean during September - November of the same year. There are blueback herring runs in many Connecticut streams, including the Naugatuck River downstream of the Kinneytown dam. Although it can be caught on hook-and-line, the blueback herring is not a highly regarded game fish. Instead, people net them for use as bait in marine fisheries and, increasingly, as food fish. It is a very important forage species on which striped bass, bluefish, and other economically-important fish prey. The restoration of blueback herring will not only benefit the Naugatuck River but also the Housatonic River estuary and Long Island Sound. Blueback herring are expected to ascend all the way to the base of Thomaston Flood Control Dam when passage is provided, although their numbers are expected to diminish as the run progresses upstream.

SEA-RUN BROWN TROUT (Salmo trutta)- Brown trout are common in many upland, cool, gravely streams. These fish spend their entire lives in freshwater but some brown trout depart freshwater and enter the ocean for reasons that are not clearly understood. These so-called sea-run brown trout follow a life cycle very similar to that of a salmon and will return to its river of origin, often at sizes of 10 - 12 pounds in weight. Sea-run trout adults ascend the rivers of Connecticut during two different periods: April through June for foraging and pre-spawning migration, and October through mid-December for spawning migration. Trout juveniles migrate downstream for the sea during April - June in one or two years following their hatching. The adults are highly-sought after by anglers and there are relatively few streams in Connecticut with sea-run trout runs. Sea-run browns are known to inhabit the the lower Naugatuck River and have been caught below the dam.

OTHER SPECIES- Fishway construction can be justified based on the preceding list of species but other species will benefit from fish passage, including: American eel, sea lamprey, white perch, smallmouth bass, and white sucker.

Targeted Geographical Area: The portion of the river targeted for fish restoration extends from the Kinneytown dam in Seymour upstream to the base of the Thomaston Flood Control Dam in Thomaston. There is suitable habitat above the Thomaston dam but the mode of operation of flood control dams makes them impossible to outfit with functional fishways. It may be possible to pass fish around this dam using trap-and-truck techniques at some point in the future when most restoration goals for the lower river have been met, but that is not being planned at this time.

At the time of this writing, consideration has focused on the mainstem river and the Mad River, a tributary that enters at Waterbury. The other tributaries will be given closer scrutiny in the future. It is likely that, in the least, the lower

reaches of some of the tributaries will be targeted for anadromous fish restoration in the future. The Mad River is targeted for restoration from above the East Brass Mill dam to the confluence with the Naugatuck River. The Homart/Waterbury Mall project along the Mad River, initiated in 1995, has incorporated fish passage for the affected stretch of stream. Actions would include two fishways and one dam removal. The plan does not address the first dam on the Mad River, the Bray Buckle Factory, which will be dealt with in another manner.

General Restoration Strategy: There are remanent runs of the targeted fish species below the lowermost dam. The strategy for restoration will be to provide fish passage around all dams in the targeted area to allow spawning populations to gain access to upstream habitat. This will allow increased production, survival, dispersal, and size of subsequent adult runs. The transplanting of fish eggs or pre-spawned adults from other rivers into upper reaches of the Naugatuck River may be considered in order to accelerate the pace of recolonization. No use of hatchery releases is anticipated. The continuing improvement of the water quality of the river, which is beyond the scope of this program, will also increase fish production and aid restoration.

There are nine intact dams in the targeted portion of the mainstem river (Table 2). No passage is proposed for the Thomaston Flood Control Dam, leaving eight dams that require action. At least two dams currently provide restricted passage to fish and would require relatively minor modifications (other than fishways) to provide unrestricted passage. The other six dams are currently complete barriers to upstream passage. Providing full passage will require either partial or full dam removal or fishway construction. The DEP will work with the dam owners, the Federal Energy Regulatory Commission, and the U.S. Fish & Wildlife Service to ensure proper fish passage facilities are designed and installed. There may be damsites in addition to those listed where the dams are more-or-less destroyed but remanent debris may create some impediment to fish passage at certain stream levels. These sites will be evaluated and dealt with on a case-by-case basis.

Fish Passage Seasons: Based on the preceding discussions, the fishways on the river will need to be operated following these schedules (subject to change for upriver facilities):

UPSTREAM: April 1 - July 15 (shad,alewife,herring,trout)*
Oct. 15 - Dec. 15 (trout)

DOWNSTREAM: April 1** - July 30 (trout and alewife juveniles, shad, alewife, herring adults)
Sept.15 - Nov. 15 (shad & herring juveniles)

(notes on next page)

*The beginning and end dates are subject to modification based on on-line experiences.

**It is likely that until trout populations increase, it will not be necessary to provide downstream passage until June 15.

Fish Production Projections: Preliminary inventories of habitat allow projections of how many fish might be produced in each reach of the river. Table 1 summarizes these projections. It is estimated that a run of ~~nearly~~ 20,000 shad to the mouth of the river can be supported along with a run of nearly ~~30,000~~ river herring. over 220,500

Timetable: The schedule for achieving full restoration will be dictated by the schedule for achieving fish passage at all barriers. Efforts are underway to provide fish passage, as of the time of this writing, but such matters are inevitably complex and time-consuming so these efforts may continue for years. Appropriate engineering solutions and funding may cause unforseen delays. Discussions with owners of the Kinneytown dam hydro project developer began in 1994 and it is hoped that fish passage construction can begin in 1997. Construction at upstream dams may wait until which time migratory fish have access to the base of the dams or until opportunities have presented themselves.

Full restoration of the watershed represents a longterm commitment by the DEP and will undoubtably extend well into the 21st century.

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Table 1. SUMMARY OF NAUGATUCK RIVER ANADROMOUS CLUPEID PROJECTIONS FOR RESTORATION

Stream Reach	End Town	Length(Mi)	Acres[1]	No. Shad[2]	No. Herring
mouth - Kinneytown	Seymour	4.1	106.40	5,320	10,640[3]
Kinneytown - Rimmon	Seymour	1.8	90.62	4,531	67,965[4]
Rimmon - Union City	Naugatuck	8.6	118.27	5,913	88,695[4]
U.City - Platts Mill	Waterbury	2.0	20.30	1,015	10,150[5]
Platts - Anaconda	Waterbury	5.9	51.47	2,573	25,730[5]
Anaconda - Plume-Atw.	Thomaston	6.8	56.37	2,818	14,090[6]
Plume-Atw. - F.C.D*	Thomaston	1.4	12.92	646	3,230[6]
above Kinneytown=		26.5	349.95	17,496	209,860
total=		30.6	456.35	22,816	220,500

*F.C.D.= Thomaston Flood Control Dam

NOTES:

[1]Estimate of areal dimensions of river within reach. These estimates were calculated using stream widths during low flow periods and therefore represent a conservative estimate.

[2]Projected production rate of 50 shad per acre. This may not be realized due to the quality of habitat and the behavior of shad.

[3]Shad number x 2 for both alewife & blueback. This may not be realized due to the quality of habitat and the behavior of river herring.

[4]Shad number x 15 for both alewife & blueback. [5]Shad number x 10 for only blueback herring.

[6]Shad number x 5 for only blueback herring.

Table 2. Dams on the Naugatuck River, Derby to Thomaston.

Dam Name	Town	Dam No.[1]	--- miles from ---- mouth	previous dam	use	FERC license	Fish Passage
Kinneytown	Seymour	124-5	4.11	-	hydro	6985	Denil (?)- 1997
Rimmon	Seymour	124-13	5.90	1.78	none	n.a.	TBA
Union City	Naugatuck	88-12	14.52	8.62	none	n.a.	breach
Platts Mill	Waterbury	151-24	16.54	2.01	none	n.a.	breach[2]
Unnamed #1[3]	Waterbury	none	21.20	4.66	?????	n.a.	breach[2]
Anaconda	Waterbury	151-11	22.52	1.32	none	n.a.	breach
Chase Brass	Waterbury	none	23.14	0.62	none	n.a.	breach
Plume&Atwood	Thomaston	none	29.36	6.21	none	n.a.	breach
Thomaston	Thomaston	1	30.76	1.39	flood control		no passage needed

[1]Dam I.D. number, CT DEP/Inland Water Resources Division- Dam Safety Section

[2]These dams are low and in poor condition. They may currently be passable to fish. They may require some improvement with a "formalized breach", pending engineering review.

[3]This dam is located immediately upstream of Freight Street in Waterbury and is only about 1.5 ft high. It is not a barrier to fish migration at most flows, but formalizing existing breaches could ensure that it is passable to all species at all flows. Its extremely small size brings into question its purpose and further information is needed to determine if breaching is appropriate.

Figure 1. Location of the Naugatuck River.