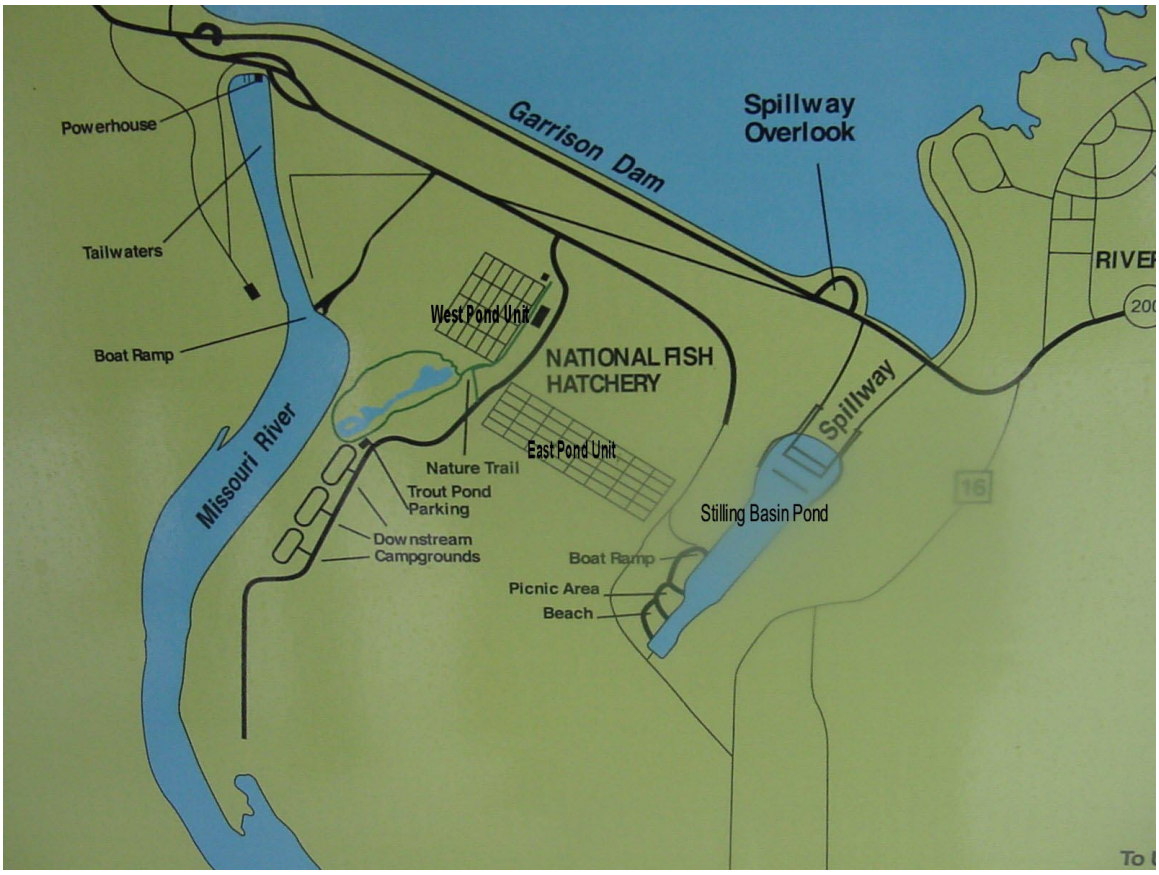
Wyoming Game and Fish Department
Fish Division

FISH IMPORTATION RISK ASSESSMENT

Fish Culture Site: Garrison Dam National Fish Hatchery, North Dakota



Primary Rearing Site Information

Location: directly below Garrison Dam (main stem Missouri River), Lake Sakakawea

Map Coordinates: GPS –101.41567, 47.48881

Drainage: Missouri River, River Mile 1390

Water Supply: two supplies,

- Main Rearing Facilities and West Pond Unit – 20" pipe supply from dam penstock at 120-foot depth, Lake Sakakawea.
- East Pond Unit – pumped from stilling basin pond, below Garrison Dam. Stilling basin pond typically receives seepage water from closed spillway gates, minimal spillway gate operation through dam history.

Fish Species Typically Reared: Garrison Dam NFH rears coldwater, coolwater and warm water species. Fish in **bold** indicate potential species for importation:

Walleye	Brown Trout (Saratoga)	Black Crappie
Northern Pike	Tiger Musky	Pallid Sturgeon
Shovelnose Sturgeon	Paddlefish	Fall Chinook Salmon
Rainbow Trout (Shasta)	Snake River Cutthroat Trout	

Rearing Facilities

Cool/warmwater Building: main unit to receive, incubate, hatch and start initial rearing of coolwater and warmwater species. Water supply for all stages is received from the penstock supply, filtered and radiated with ultraviolet light. Effluent drains to common collection where water is primarily pumped to the West Pond Unit for initial filling.

Coldwater Production Buildings: the coldwater production buildings are not rearing facilities for cool/warmwater fish production. Effluent drains to the common collection.

Sturgeon Building: Primary holding facility for sturgeon brood stock and recruitment with salmonids reared in linear raceways. Effluent drains to the common collection.

West Pond Unit: twenty-three (23) 1-1/2 acre ponds. Ponds filled by water pumped from effluent common collection downstream from rearing buildings, or on occasion from 20" penstock water supply depended on lake temperature. Ponds harvested to common outside kettles for sampling and inventory. Kettle water supplied by draining ponds of same species fish or from common collection supply. Any make up water provided from common collection or penstock pipe supply.

East Pond Unit: forty (40) 1-1/2 acre ponds. Fill water pumped from stilling basin pond below the Garrison Dam spillway. A couple of ponds, due to leakage, require make-up water pumped from the stilling basin pond. Kettle water provided by draining ponds of same species fish, or pumped from stilling basin.

Propagation of Fish for Importation

Northern Pike: reared in West Pond Unit **only** (APPENDIX A).

- Spawning Site – Lake Ashtabula (Sheyenne River drainage of the Red River) and/or Spiritwood Lake (James River drainage of the Missouri River) and or Lake Sakakawea.
- Spawning Period – typically April 1 through April 15.
- Incubation – Garrison Dam NFH, incubation jar batteries receiving penstock water after sand filtration and UV treatment.
- Incubation Period – typically 20 to 25 days to hatch (April 25 to May 10).
- Hatching – fry moved from hatching jars to fry troughs after swim-up. Stocked into ponds approximately at 10 day of age at 50F following swimup (May 5 to May 20).

- Pond Preparation – filled April 15 through May 1, 10-15 days prior to stocking. Ponds initially fertilized with 200 pounds of alfalfa meal during this period and every 3 days during fish production.
- Pond Production Period – fry reared in ponds for twenty (20) days.
- Pond Harvest – water and fingerlings drained from pond to common outside kettle, one pond at a time (May 25 to June 15). Back up water in kettle provided by same species pond under initial drawn down prior to harvest. Fingerlings are loaded for distribution within 12 hours of harvest.

Walleye: primary species reared at Garrison Dam NFH in both West and East pond units (APPENDIX B and APPENDIX C respectively).

- Spawning Site – Lake Sakakawea, lower reaches
- Spawning Period – typically April 25 through May 25 (at latest).
- Incubation – Garrison Dam NFH, incubation jar batteries receiving penstock water after sock filtration and UV treatment.
- Incubation Period – typically 20 to 27 days (300 TU) to hatch.
- Hatching – fry migrate to common holding tank at 1 day old and marked with oxytetracycline (OTC) for otolith marking. Typically transferred from the holding troughs to ponds at one (1) day of age after OTC treatment.
- Pond Preparation – Filled May 15 through May 31, 10-15 days prior to stocking. Ponds initially fertilized with 200 pounds of extruded alfalfa pellets during this period and every 3 days during fish production.
- Pond Production Period – fry reared in ponds for thirty (30) days.
- Pond Harvest – water and fingerlings drained from pond to common outside kettle, one pond at a time (June 25 to July 10). Back up water in kettle provided by same species pond under initial drawn down prior to harvest or fresh flow pumped from stilling basin. Fingerlings are loaded for distribution within 12 hours of harvest.

Drainage Information

Fish in Drainage*: Lake Sakakawea and stilling basin pond (water supplies). Species in **bold** indicate species not found in Wyoming.

Walleye	Brown Trout	Northern Pike
Black Crappie	**Shortnose Gar**	**Pallid Sturgeon**
Shovelnose Sturgeon	**Paddlefish**	**Fall Chinook Salmon**
Goldeye	**Lake Whitefish**	**Rainbow Smelt**
White Sucker	**Cisco**	**Coho Salmon**
Common Carp	Brassy Minnow	W. Silvery Minnow
Plains Minnow	Fathead Minnow	Creek Chub
Flathead Chub	**Sicklefin Chub**	**Golden Chub**
Emerald Shiner	Common Shiner	Sand Shiner
Spottail Shiner	Red Shiner	**N. Redbelly Dace**
River Carpsucker	Longnose Sucker	Blue Sucker

Fish in Drainage (Continued)*: Lake Sakakawea and stilling basin pond (water supplies). Species in **bold** indicate species not found in Wyoming.

Smallmouth Buffalo	**Bigmouth Buffalo**	Shorthead Redhorse
Black Bullhead	Channel Catfish	Flathead Catfish
Stonecat	**Tadpole Madtom**	Burbot
Brook Stickleback	**White Bass**	Green Sunfish
Pumpkinseed	Orangespotted Sunfish	Bluegill
Smallmouth Bass	Largemouth Bass	White Crappie
Iowa Darter	Johnny Darter	Yellow Perch
Sauger	Freshwater Drum	

*List identifies fish present in Lake Sakakawea from the Williston Reach to the Garrison Dam, representing all habitats present in the lake body and tributary drainages.

Amphibians in Drainage:

Species Identified in Drainage	Drainage in Species Probable Range
Plains Spadefoot Toad (*Scaphiopus bombifrons*)	Woodhouse's Toad (*Bufo woodhousei*)
Great Plains Toad (*Bufo cognatus*)	Canadian Toad (*Bufo hemiosphrys*)
Northern Leopard Frog (*Rana pipiens*)	Wood Frog (*Rana sylvatica*)
Tiger Salamander (*Ambystoma tigrinum*)	Western Chorus Frog (*Pseudacris triseriata*)

Known Aquatic Nuisance Species in Drainage: curly-leaf pondweed (*Potamogeton crispus*). Initially identified in bay areas of Lake Sakakawea in 2001. Also found in low levels within stilling basin pond, growth at this time limited. See APPENDIX D for life history information.

Aquatic Nuisance Species (ANS)/Non-Target Species (NTS) Identification and Interaction

Aquatic Nuisance Species (ANS) Plants – Curly-leaf pondweed (*Potamogeton crispus*): according to Garrison Dam NFH personnel, aquatic macrophyte growth in production ponds is never observed due to short use period, thirty-five to forty-five days. Filamentous algal forms only plant growth seen in low densities and occasionally released into kettles. At present, unless curly-leaf pondweed is seen in production ponds, protocols for identification and removal of any macrophyte during harvest and loading will be employed.

- Production Sites
  - ✓ Egg and fry rearing: No exposure to curly-lead pondweed, water supply filtered and radiated with ultraviolet light.
  - ✓ West Pond Unit: No exposure to curly-leaf pondweed from penstock water supply.
  - ✓ East Pond Unit: Possible exposure to curly leaf pondweed during the pond filling period. Only two of the forty ponds require make up water from the stilling basin pond water supply.

- Harvest kettles: identification and removal of any macrophytes during kettle setup, initial pond drainage, lot inventory and stock loading. Water flows through kettle pins any trash and vegetation against outflow screens for easy identification and removal.
- Fish loading: macrophytes observed and removed during, netting, weighing and transporting into distribution unit.
- Fish transportation: macrophytes observed and removed during in transit checks and netting loads.
- Fish stocking: macrophytes not allowed in nets or buckets during distribution. If, after all checks, macrophytes are still present in the tank, water will not be discharged directly into surface water and all remaining fish sorted clean of any aquatic vegetation.

Non-Target Species (NTS) Plants: filamentous algae only vegetation found in fish production ponds, occasionally flushed into kettle during harvest. Algal forms are not a concern during harvest and transportation.

Non- Target Species (NTS) Fish: although infrequent, NTS fish may be present in kettles during harvest.

- Production Sites
  - ✓ Egg and fry rearing: No exposure to NTS, water supply filtered and radiated with ultraviolet light. Timing of species and size maintain monoculture environment.
  - ✓ West Pond Unit: Possible NTS exposure during pond filling from collection sump. Although very seldom, **Chinook salmon** and other **salmonids** have been identified and removed during loading from the kettles. One **white sucker** was identified in a kettle, but its introduction due to loose downstream screen. Protocols in setting up the kettles have eliminated this issue. **Northern pike** have also been identified in the past with walleye, but pond management has eliminated this situation. Due to time of pond production, all NTS (**salmonids**) are easily identified and removed from target species (target species 1 to 1-1/2 inches; NTS 3 to 6 inches).
  - ✓ East Pond Unit: Possible introduction of **yellow perch fingerling** during the pond filling for walleye production. Presence is sporadic, dependent on pond filling and spawning timetable of yellow perch. Ponds filled during this period are easily identified and isolated from other production.
- Harvest kettles: identification and removal of any NTS fish during kettle setup, initial pond drainage, lot inventory and stock loading. Ponds/kettles with NTS fish are identified and communicated.
- Fish loading: any NTS fish are observed and removed during, netting, weighing and transporting into distribution unit. Larger fish are easy to identify and removed after coming to the top of the netted mass of smaller fish before placing into the distribution unit. Loads with acceptable NTS fish can be separated and stocked in water identified to receive allowable NTS. Refer to Appendix E, "Stocking Guide for Non-Target Species Management".

- Fish transportation: If any NTS fish remain, can be observed and removed during in transit checks and netting loads.
- Fish stocking: NTS not allowed in nets or buckets during distribution. If, load is accepted with NTS, any remaining fish are stocked. If load is requested without any NTS, the load is rejected at Garrison Dam National Fish Hatchery **or** sorting procedures to remove all NTS are implemented prior to stocking. Procedures utilized are depended on level of risk considered for each stocking site under Hazard Analysis Critical Control Point (HACCP) program prior to leaving Garrison Dam National Fish Hatchery.

Non- Target Species (NTS) Amphibians: although rare, NTS amphibian life stages (tadpoles) may be present in kettles during harvest. Densities generally very low if present and individuals can be easily removed.

- Production Sites
  - ✓ Egg and fry rearing: No exposure to NTS, water supply filtered and radiated with ultraviolet light. Timing of species and size maintain monoculture environment.
  - ✓ West Pond Unit: Possible NTS amphibian introduction from spawning directly in pond.
  - ✓ East Pond Unit: Possible introduction of NTS amphibians during the pond filling for walleye production or from spawning directly in production pond. Presence is rare, dependent on pond filling and amphibian reproduction timetable.
- Harvest kettles: If needed, identification and removal of any NTS amphibian can be accomplished during kettle setup, initial pond drainage, lot inventory and stock loading.
- Fish loading: If needed, any NTS amphibians are observed and removed during, netting, weighing and transporting into distribution unit.
- Fish transportation: If any NTS amphibians remain, can be observed and removed during in transit checks and netting loads.
- Fish stocking: NTS amphibians will not be released during distribution unless they are already present and HACCP procedure confirm no risk with stocking.

Non- Target Species (NTS) Invertebrates: clam shrimp (*Eulimnadia texana*) are the only NTS invertebrate present in the West Pond Unit only. These invertebrates are, on occasion, found in extensive static fish culture environments and pose no risk to fisheries through introduction since they only inhabit ephemeral aquatic habitats and are common under these conditions.

Specific Pathogens of Concern and/or Other Health Concerns: Garrison Dam National Fish Hatchery salmonid production is inspected annually and is Specific Pathogen Free (SPF). An irridovirus specific to sturgeon has been identified at the facility, however is not an issue with identified importation species and their production process. No parasites are identified or noted on fingerlings at any of the facilities or ponds.