PALLID STURGEON PROPAGATION
2005
Garrison Dam NFH

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Background/Introduction

The Pallid Sturgeon Recovery Plan (1993) established guidance for collection of wild brood fish, propagation, research needs, and reintroduction of progeny to accomplish recovery goals. This hatchery's role in the recovery effort focuses on the development of techniques for spawning and rearing of pallids and propagation for augmentation. Pallid Sturgeon propagation at Garrison Dam NFH began in 1997. Successful spawning has occurred annually since 1998. Both the 1999 and 2000 year classes propagated at Garrison were destroyed after being identified positive for Pallid Sturgeon Iridovirus (PSIV). April 2002 marked the first stocking of yearling (2001 year class) pallids from this facility. Recapture data from the stocked fish indicates that short term growth rates in the wild are comparable to that achieved in the hatchery; further suggesting that the hatchery reared fish are adjusting well to the Missouri River and it's selection of food. Recapture numbers are not sufficient to draw any conclusions on survival however, survival from this facility is comparable to other hatcheries based on the number of recaptures available.

Objectives

Objectives this year were changed during broodstock collection as a result of Montana Fish Wildlife and Parks policy decision not to stock fish from PSIV positive facilities and uncertainties surrounding the genetics of the fish in the Upper Basin used to supplement the population in RPA #4. All four hatcheries used in past pallid propagation will be utilized in 2005, however Garrison Dam NFH's role will be minimal. At Garrison Dam NFH we went from four females and sixteen males to one female and three males. Pairing for family lots will be based on the results from the Abernathy FTC for broodstock selection. Milt from all hatcheries will be shipped overnight to be cryopreserved. We plan on producing (1) 1X3 mating using the broodfish on station and those at Miles City SFH. The maximum production requested from Garrison Dam NFH is 2300 eight inch Spring stocked fish. Tank densities will be maintained below 0.25 pounds per square foot to evaluate the effect of density on viral expression.

Eight thousand eggs (200 mls) per family will be sent to Bozeman FTC for propagation. Five thousand eggs per family will be sent to Gavins Point NFH for broodstock development and stocking in RPA 3. Two thousand eggs per family will be sent to the University of California, Davis for research on the iridovirus.

Miles City SFH will be supplied with five adults, three males and two females. In addition to spawning in June they will be culturing four family lots from 2004 to a tagable size prior to stocking in RPA #2 later in the summer. Miles City SFH will create (2) 1 X 3 matings producing

6 family lots. Six family lots will be held at Miles City SFH. Miles City will be producing 2,000 spring stocked fish.

Bozeman FTC will be propagating 2004 progeny for stocking RPA #1 and taking the lead spawning riverside again on the CM Russell Refuge. Eggs from this spawning event will be held at both the Bozeman hatchery and Gavins Point NFH.

Gavins Point NFH will be back into the picture this year spawning the five broodstock collected this past Fall. Crews were at the confluence on Nov 9, 2004 for the Fall capture. Water temperature at the confluence was 43°F. The target was 2 females and 3 males. The boats began fishing from the confluence just after 9:00 am. Two fish were caught near the confluence, one male #7F7B031F17, one female #115676635A. At about 2:00 the effort was shifted downstream. Four additional pallids were collected with the last fish, a female #115557165A, caught near Erickson Island at 3:50 pm. Two males 7F7D517479 and 7F7D2D273D were also loaded on the distribution truck for transport to Gavins Point after having blood taken and OTC injections. All fish were cathetered and egg samples preserved. An immature egg stage female was also collected #7F7D517479 as was the immature female that was CART tagged this Spring. The CART tagged fish was not cathetered but it was noted that she was not 'plump'. Gavins Point will produce (2) 1X3 family lots. Gavins Point also has one 1992 year class domestic broodstock and 2 captured males from RPA #4 that will be mated in a 1X2 matrix. Gavins Point will be providing fish for RPA #3 from the upper basin fish and RPA #4 from the domestic brood.

Spring Capture 2005

April 26- Start of broodstock collections. A single male captured and taken to Miles City SFH. Blood was drawn and processed on site.

April 27- One male and two females (4443240458, 44635F477B) captured, cathetered and taken to Miles City SFH. Blood work was completed on site by Molly Webb and Alan Alert. Egg samples processed by Molly Webb. One female, 7F7B026102, was recaptured and cathetered. Four eggs were sampled. This fish was spawned in 2003 at Garrison Dam NFH - ovulation occurred but no survival of the eggs in 2003. This fish was taken to Garrison Dam NFH. Another fish was captured and cathetered. The catheter pull contained only fatty tissue. The fish was assumed to be a female with fally ovaries and was released. It was a 'new' fish. Water temperature 49°F - overcast and snow.

April 28- Three males were collected in the Confluence and blood samples taken. One fish #7F7B023253 was cathetered. The fish was an unknown recapture from 1992. The second fish #1F482F3F2B was spawned successfully at Garrison in 1999 but the progeny destroyed after being diagnosed virus positive. In the second spawning attempt on this fish in 2002 at Miles City the fish didn't produce milt. The third male captured was successfully spawned in 2003 and so the fish was released.

April 29 - One fish collected, 115553761A. The fish was cathetered - suspect male. End of collections. No fish were injected with antibiotics this Spring at the time of capture.

Spawning and Production

The adults at Garrison Dam were held in water temperatures approximating those found in the Yellowstone and Missouri Rivers during the months preceding spawning. Lights in that corner of the facility were kept off and visitors were not allowed to view the fish. A window adjacent to the tank provides any photo period cues they may have lacked in the past using artificial lighting.

June 2th we collected 35 eggs from the female to run maturation tests. The results of the progesterone tests were 100% negative - 0/9 on both progesterone assays. The assay was run for 16 hours at 16°C (61°F). A control was run with ETOH - 1/8 breakdown. The polarity index had a mean of 0.1135 and a standard deviation of 0.0224. The Polarity Index at capture (4 oocytes) had a mean of 0.1341 and sdev of 0.0144. Based on PI values at capture, egg development is progressing as expected.

June 9 - One of the Miles City females, 4443240458, ovulated well producing 162,000 eggs. The two males, 444334021A and 115633183A, held at Miles City were used in creating a 1X2 cross. The fish ovulated at 8:00 pm and four collections were made ending at about midnight.

June 10 - A female, #132213574A, is collected above Ft Peck Reservoir. Matt Toner of the Bozeman FTC ran the PI at 0.07 and the assay at 100% GVBD.

June 14 - Injected two males, 7F7B023253 and 1F482F3F2B, with 0.02 mg/kg LHRH at 5:00 pm. The males were needed for the female collected above Ft Peck Reservoir. Two family lots produced at Miles City on June 9 were brought to the hatchery. We met Miles City staff at the confluence, assisted in returning the female to the river and brought the eggs. Water temperature was 63° F on the eggs. Each family had 100 mls with an estimates size of 40/ml. At the hatchery the eggs were disinfected with 100 ppm Betadine for 15 minutes.

June 15 - Collected milt from both males at 11:30. Milt had good motility and volume. It was shipped in four 500 ml Nalgene containers, topped with O_2 and with an ice pack. The milt arrived in good shape the morning of the 16th in Bozeman. The eggs from Miles City are starting to hatch. Some fungus is on individual eggs. About 150 dead or fungused eggs are pulled from one lot, 50 from the other. Collected milt again at 3:30 pm.

June 16 - Collected milt at 11:30 for shipment to Warm Springs FTC. The milt looks good both volume and motility. The milt was diluted 50% with extender, HBSS, prior to shipment.

June 17 - Calculated PI at 0.097 and evaluated the progesterone assay from June 15th. The control had 100% intact oocytes, one of the progesterone vials had 50% breakdown, the other 60%.

June 20 - Switched water supply from main building to Salmon Building - using strictly heat pumps to provide heated water. Sent milt collected on Friday, June 17 to Gavins Point NFH.

June 21 - Gavins Point spawned two females and created 6 families with males on station. The

milt shipped from Garrison Dam NFH was marginal so wasn't used.

June 23 - Initiated feed on the Miles City fish. Feeding Biodiet #1 Starter ad lib to maintain water quality in tank.

June 24 - Heat pump #1 not operating. Shut down system and started boiler in Salmon Bldg.

June 27 - Sampled eggs from female 6102. Approximately 200 oocytes collected. The first pull on the catheter resulted in 2 oocytes and a plug of fat. The second attempt further anterior in the ovary was successful. The eggs were boiled and the progesterone assay was run.

June 28 - Received 6 family lots from Gavins Point NFH - 2(1X3) crosses. Eggs were sampled at Yankton at 42/ml and 75 mls were sent per family for 3,150 eggs each. Eggs hatching on arrival.

June 30 - Corps of Engineers pulsed releases from the reservoir are showing up as 7 degree Fahrenheit increases in temperature starting at 9:00 am with a rapid rise through to 5:00 pm, then gradual drop down. Maintaining a steady temperature with our equipment isn't practical. An in line thermostat is needed on our process water with feedback to the boiler to even out temperatures swings.

July 1 - Moved Gavins Point pallids into two tanks per family. Miles City progeny moved to 4 foot tanks.

July 5 - At 10:30 am, injected all three males at 0.02 mg/kg LH-RH and collected blood samples. Blood samples were spun down and frozen. Salt was added to the tank post handling.

July 6 - Restarted heat pumps. The initial injection was given at 9:45 am for the female #6102 at 0.005 mg/kg. The temperature at injection was 15.5° C. The heat pumps shut off during the night and had cooled from 18°C. The female was given the resolving dose of LH-RH at 9:30 pm. Salt was again added to the tank after handling as the standard protocol. Milt from #761A was taken at noon. There were only a few sperm cells seen under the scope at 40X. Will need to wait until tomorrow for a FedEx shipment.

July 7 - Restarted heat pumps - The temperature had dropped from 17°C to 15°C by morning. The average temperature during the hormone induced phase of ovulation was 16.5° C. The minimum was 15°C and maximum was 18°C with a standard deviation of 1.1°C. Miles City SFH called to let us know their two males did not spermiate. Female was checked at 7:15 for eggs - none present. Male #115553761A was also checked at this time - milt was recovered with good quantity and motility. Shipped milt from #115553761A to Warm Springs FTC, diluted 50 % with extender and to Miles City SFH via private plane at noon. Milt was taken from the other two males here at Garrison - neither had sperm cells. Arrangements were made with Valley City NFH to transport two cryopreserved milt samples at the start of ovulation. Eggs were recovered at the 12:00 am check. Milt was again taken from all three males. This time, male #7F7B023253 provided milt with sperm - activated it under scope. The milt was fair to poor quality. Decided to go with the fresh milt rather than use the cryo- repository. Ovulation

progressed well for female #6102. Eggs flowed well by palpation at each of eight collections. Eggs crossed with male 3253 are clumping. Color is darker than the other cross but cleavages are apparent. This condition typically suggests that fertility was not good and was somewhat expected due to the poor milt quality.

July 8 - After the final collection, 21 hours post ovulation (9:00 am July 8), a 3ml sample of blood was collected for chemical analysis. All four broodstock loaded on the distribution truck at 9:15am and taken to the confluence. Fish hauled well - water temperature in the Yellowstone 70° F and turbid - flows about 20,000 CFS. Eggs at yolk plug formation stage.

July 11 - Sent eggs to Bozeman FTC, Miles City SFH and Gavins Point NFH. The eggs were shipped at 55°F and ice was added.

July 12 - Inventory and move Gavins Point NFH fry to 5 foot tanks. Moved jar from the 2:00 pm male 3253 cross to tank 30 in anticipation of hatch. Gavins Point NFH received eggs at 64 and 66 °F (9-11 degree warmup). The eggs were sampled at 43/ml - started hatch on July 14.

July 13- By morning hatch was progressing rapidly. Inventory and move remaining Gavins Point NFH fry to 5 foot tanks. Moved all remaining jars to fry tanks for hatching. Collected 50 fry of each of the two families for the genetics work at Abernathy FTH.

July 14 - Picked off dead eggs and distributed fry evenly among fry tanks. Froze 40 grams of fry for Bozeman fin curl study - proximate analysis.

July 25 - Moved fry from fingerling tanks to growout tanks. Redistributed fry from Miles City progeny to meet September density goals. A treatment group of 5 five foot tanks are on non-UV treated water to evaluate their susceptibility to the iridovirus and determine the effectiveness of our UV system. Noted a few fry in tank 24 with fluid filled abdomens 6102 X 761A. Similar fish found on progeny at Miles City with that family lot (per Mike Rhodes, MCSFH).

July 27 - Destroyed 10,943 pallid fry in excess of projected capacity goals from the family lots produced at Garrison Dam NFH (9,269 from 6102 X 761A and 1,674 from 6102 X 3253).

August 10 - Inventoried Miles City and Gavins Point progeny - finished inventory on the 16th.

August 23 - Inventoried two Miles City tanks that will be sent to USGS/BRD Upper Midwest Environmental Sciences Center for aquaculture drug research. FT17 (0458 X 021A) was at 1.186 fish per gram (2.65") and FT20 (0458 X 183A) was at 1.158 fish per gram (2.63")

August 25 - Sent 5 boxes of pallid sturgeon (648 fish) excess to production needs to the research center in La Crosse, WI via Fed Ex. The breakdown of fish sent as follows: FT17 (0458 X 021A) 202 fish, FT20 (0458 X 183A) 80 fish, FT19 (165A X 1F17) 181 fish, FT22 (165A X 723D) 185 fish. Signed Letter of Authorization from ARD Ecological Services was obtained. Fish shipment was delayed in route - 28 hours later they were picked up at the airport - 60 fish had died. The water temperature was 68°F. The larger fish from Miles City female 0458 were 1.12 grams each (2.6"). The maximum weight sent in 2 gallons of water was 0.25 pounds (102 fish).

August 26 - Began feeding using Sweeney feeders on the Miles City progeny.

August 29 - Began using Sweeney feeders on all tanks. Fish appear to be more broken in size compared to previous years. Hand feeding 9 times daily on the hour may not be frequently enough. Other possibilities include cooler water temperatures and fry quality.

September 14 - Fingerlings from Miles City and Gavins Point progeny were weighed, measured and preserved in Davidsons for histology.

October 3 - Results back from fish health assessment. 49 samples all negative for iridovirus. Tagging began at 9:30 am with 2 CWT machines, 3 air elastomer and 3 handheld. The fish received a yellow parallel tag (right) for year class and a perpendicular (left) tag for stocking site. 2811 fish were tagged by 4:00 pm representing 3 family lots. The fish were tagged and held in 5 tanks in the main hatchery building on 61°F water.

October 4 - Sent 12 live fish representing the Garrison spawn to Bozeman for a fish health assessment. Requested that the 60 fish sample be conducted at this time as well (non-uv treated fish). Finished tagging the fish from Miles City and Gavins Point spawn.

October 11 - Results back from Bozeman FHC that the 12 lots are also virus free. Received Fish Import Permit for 8000 pallids

October 12 - Bozeman FHC conducted fish health assessment on 60 non-UV treated pallid sturgeon.

October 13 - 4,330 tagged fish for the three Missouri River stock sites (Milk - 845, Wolf Point - 1749, Culbertson - 1736) are picked up by MFWP personnel (Mike Ruggles) at the hatchery and stocked.

October 17- 18 Tagged fish from the two Garrison Dam NFH family lots. Did length/weight on Oct 3 tagged fish (Intake)

October 20 - Hauled 3,313 tagged fish to Sidney and Intake and MR sites. Met Matt Baxter (MFWP) at Sidney to transfer fish for the Missouri River stockings at Culbertson, Wolf Point and the Milk.

October 24 - Collected broodstock for Gavins Point NFH. Two females and three males collected below the confluence (sheep farm). Female pit #'s 4064021213, 4063767709 and male PIT #'s 4443422E34, 40637D481B, 7F7F066471.

October 28 - Received Fish Import Permit for an additional 3000 pallids

November 2 - Hauled 1,471 tagged fish to Sidney and Intake and MR sites. Met Matt Baxter (MFWP) at Sidney to transfer fish for the Missouri River stockings at Culbertson, Wolf Point and the Milk.

November 18 - Switched heated water source from the Salmon Building to the Main Hatchery Building.

November 27 - Power outage from 8:00 pm to 10:00 pm. Jumpers on overhead line at powerhouse shorted out causing power failure. The automatic valve in the sturgeon building closed as engineered to prevent any unfiltered water from reaching the production tanks and from creating thermal stress. The fish were on 60 °F water and incoming lake water was 43°F. The 2 hour shutdown in water didn't appear to stress the fish - feeding activities continued throughout the shutdown.

November 28 - A representative sampling of the 10 family lots was taken - length and weight from 52 individuals to provide an estimate of density. Nitrogen readings are up from 100% to 103%.

December 6 - Nitrogen readings in head tank at 97%. Tank readings vary from 99-103%. Issue may be in spray into tank (angle of spray - plunge effect).

December -Switched feed size to #3

January 11 - Moved fish from the South 8 foot tank (6102X3253) to the green tank to begin installing 8 new five foot tanks. The total weight was 24.8 pounds (12.58 fish/pound). The calculated average length was 8.3 inches.

January 12 - Moved fish from the North 8 foot tank (6102X761A). The total weight was 38.5 pounds (8.08 fish/pound). The calculated average length was 9.6 inches.

January 24 - Moved fish into the six new 5 foot tanks A6:A8 and B6:B8 and took weight values to determine growth (see Table 12. Growth Rates).

February 21 - Sampled 60 fish for iridovirus. Pectoral fins clipped and preserved. This was not a lethal sampling. The samples were preserved overnight in Davidson's and shipped on the 23rd in 70% ethanol to Bozeman FHC. Lethal sampling scheduled for March 20 - 20 fish.

March 7 - Received confirmation back from the Bozeman Fish Health Center that the fish are negative for the virus.

March 22 - Twenty lethal samples were taken from 7 of 10 family lots (selected by FHC). Samples submitted included barbel, pectoral fin and liver.

March 30 - Gavins Point NFH crew up to pick up 120 fish from three family lots for the broodstock program. The lots they were missing were Miles City lots (0458 X 021A and 0458 X 183A) and 6102 X 761A.

April 3 - Tagging operations began with 4 crews implanting PIT tags and yellow elastomer (right parallel) for the year class mark. By 2:30 the fish for stocking the Yellowstone are finished up and loaded into the 'salt' tank. A screened compartment in the tank separates out the Sidney fish from the Intake fish. NDGF personnel from the Williston office are here to take the trip. Shane

reported back that oxygen levels were causing the fish to stress and he increased oxygen flows. The fish responded well and looked fine at the time of stocking. At the hatchery we finished up tagging the initial request number for the Milk stocking site.

April 4 - Tagging concluded today at 2:30 for all stocking sites. A total of 3996 fish weighing 537 pounds and averaging 9.9 inches in length. Report from the Bozeman Fish Health Center completed:

All 60 fish were negative for iridovirus (CHN 06-96)
Fish Health Assessment on 20 fish CHN 06-104 (5 fish from each of 4 females)
Liver fat vacuolation: mean = 3.9 (range 3-4.6)
Barbel Sensory (#/field): mean = 4.4 (range 1.4-6.5)
Epidermal mucus cells in fins: mean = 108.3 (range 0-221)

April 5 - Fish for the three Missouri River sites were stocked today. Water temperature in the hauling tanks was 42°F and at the stock site was 43°F. Oxygen levels in the hatchery's 4 compartment tank was checked regularly and saturation was maintained between 120-130% saturation (see Table 7).

Fall Capture 2005

Fall broodstock collections took place on October 24, 2005. Several crews from the FWS and MPWS were onsite for collections. Blood samples were taken at capture and evaluated by Alan Alert and Molly Webb. Biopsy work was performed by Kevin Kappenman. Fourteen adults were collected, six females (4 immature) and 8 males (see Table 2). One of the four females collected, 115553544A, was previously collected on April 21, 2004. An egg sample was taken at that time using a catheter to confirm the immature stage of egg development (small white oocytes). A CART tag #31 was implanted by Dave Fuller on site and the fish released at the confluence boat ramp. This fish was biopsied today, October 4, 2005 to determine egg stage - again in an immature state. This fish likely spawned this Spring/Summer. It was captured first in 1999 and spawned at Garrison Dam NFH. 53,400 eggs were taken and four families made. The fry quality was poor and survival low in all four family groups. All fish were destroyed the following Fall (October 12, 2000) as advanced yearlings after being diagnosed positive for the iridovirus. The fish was captured again on April 23, 2002 and determined to be a male by the USGS ultrasound team - at the hatchery (GDNFH) immature oocytes were sampled by catheter on June 4, 2002. The oocyte sample also contained shriveled black eggs from an aborted spawn attempt in 2001. This fish apparently has a two year spawning cycle with evidence of spawning activity in 1999, 2001 and 2005.

The other female with immature oocytes, PIT # 220E5F6E26, was previously captured in 2002, 2003, and 2004. This fish was taken to the hatchery (GAD) in 2003 as a potential male. It was cathetered but no eggs were collected. It was injected with LH-RH but there was no response to the injection. At that point it was presumed a female with immature eggs. It was returned to the confluence in August after having an external CART #31 tag attached at the hatchery. When it was captured in 2004 it was unfortunately not checked for spawning state, the external tag was removed and the fish released. Then in 2005 it has immature oocytes. This fish is also likely on a two year cycle.

Table 1. Pallid Broodstock Data - Spring.

2005 PALLID STURGEON BROODSTOCK DATA - SPRING COLLECTION								
Tag Number	Date	Sex	Wt lbs.	2nd Tag Number	Other Info	Spawn results		Spawn Site
						Cryo	Progeny	
115676635A	11/09/04	F				-	Yes	GAP
115557165A	11/09/04	F				-	Yes	GAP
7F7B031F17	11/09/04	M				Yes	Yes	GAP
1F50072169	11/09/04	M				No	Yes	GAP
7F7D2D723D	11/09/04	M				No	Yes	GAP
115633183A	4/26/05	M				No	Yes	MC
4443240458	4/27/05	F				-	Yes	MC
44635F477B	4/27/05	F				-	Yes	MC
444334021A	4/27/05	M				No	Yes	MC
115679523A	4/27/05	U	40		Suspect female - fatty tissue by catheter - released	-	-	-
7F7B026102	4/27/05	F	49		Unsuccessful in 2003 at GAD - success in 2005	-	Yes	GAD
7F7B023253	4/28/05	M	41		Recapture from 1992	Yes	Yes	GAD
1F4A363031	4/28/05	M			Recap from 2003 has cryo and progeny - released	-	-	-
1F482F3F2B	4/28/05	M	33		Successful spawn in 1999 but not in 2002	Yes	Yes	GAD
115553761A	4/29/05	M	41		Milt to MC and at GAD	Yes	Yes	GAD
132213574A	9/10/05	F			Upper Missouri River (Above Fort Peck)	-	Yes	BOZ

Table 2. Pallid Broodstock Data - Fall.

2005 PALLID STURGEON BROODSTOCK DATA - FALL COLLECTION								
Tag Number	Date	Sex	Wt lbs.	2nd Tag Number	Other Info	Spawn results		Spawn Site
						Cryo	Progeny	
4064021213	10/24/05	F	62		new fish	-	-	GAP
4063767709	10/24/05	F	~50		new fish	-	-	GAP
4443422E34	10/24/05	M			new fish	-	-	GAP
40637D481B	10/24/05	M			new fish	-	-	GAP
7F7F066471	10/24/05	M			Last caught in 1994	-	-	GAP
115529097A	10/24/05	M	~35		RELEASED - Caught in 2001 & 2004	Y-04	No	GAD
40640E4158	10/24/05	F	~30		RELEASED - new fish	-	No	-
7F7D372A6B	10/24/05	M	~32	CART #6	RELEASED - Spawned in 2003	Y-03	No	GAD
220E5F6E26	10/24/05	F	~50	EXT CART #31	RELEASED - Immature egg stage. 2002,03,04	-	No	GAD
115553544A	10/24/05	F	~45	CART #31	RELEASED - Immature egg stage.1999, 02, 04	-	Destroyed	GAD
1F4A363031	10/24/05	M	~40	EXT CART #30	RELEASED - Captured 1998,99,01,03,04	Y-03	Yes-03	GAD
7F7F066452	10/24/05	F	~25		RELEASED -Spawned in 2004	-	Yes-03	MC
454B380D60	10/24/05	F	~30		RELEASED- Spawned in 2004	-	Yes-03	MC
115675486A	10/24/05	M	~27	CART #33	RELEASED - Spawned in 2003	Y-03	Yes-03	GAD

Table 3. Female #7F7B026102 - Spawning Results

FEMALE #7F7B026102												
TIME	**DATE**	**MALE #**	**Milt Time**	**Mls eggs 20 min post spawn**	**# EGGS @ ~50/ml**	**Percent Fertilization**	**Egg volume milliliters (7/11)**		**Total eyed egg number (48/ml)**	**Estimated Inventory at hatch**	**Fry mortality to Aug 1**	**Survival to 2 weeks**
							Kept	**Shipped**				
9:45 a	7/6/05	Initial injection										
9:30 p	7/6/05	Resolving dose										
12:15 p	7/7/05	115553761A	12:00	100	5000	99%	0	100	4752	-	-	-
2:00 p	7/7/05	7F7B023253	2:00	190	9500	61%	80	100	5270	2874	211	93%
4:00 p	7/7/05	115553761A	4:00	10	500	99%	10	0	475	*	-	-
4:25 p	7/7/05	115553761A	4:00	380	19000	99%	200	200	9504	*	-	-
6:00 p	7/7/05	7F7B023253	11:45	300	15000	8%	~250	0	960	685	171	75%
8:00 p	7/7/05	115553761A	4:00	530	26500	99%	300	100	19008	*	-	-
9:45 p	7/7/05	7F7B023253	11:45	280	14000	4%	~300	0	576	799	243	70%
9:45 p	7/7/05	115553761A	4:00	100	5000	99%	300	100	19008	25040*	6600	74%
9:00 a	7/8/05	115553761A	4:00	460	23000	1%	~300	0	144	277	218	21%
TOTAL				2350	117500		1450	600	59698	29675	7443	75%

* Inventory at hatch combined from all four take times

Table 4. Milt Collections 2005

Milt Collections								
Pit Tag #	Amount Taken (mls)	Inj Date	Inject Time	Take Date	Time	Motility	Characteristics	Milt Cryo
1F482F3F2B		6/14	5:00p	6/15	11:30 a	100%	2% - looks good	N
7F7B023253		6/14	5:00p	6/15	11:30 a	100%	2% - looks good	N
1F482F3F2B				6/15	3:30 p	100%	2% - looks good	N
7F7B023253				6/15	3:30 p	100%	2% - looks good	N
1F482F3F2B				6/16	11:30 a	100%	2% - looks good	Y
7F7B023253				6/16	11:30 a	100%	2% - looks good	Y
115553761A		7/5	10:30a	7/6	12:00n	100%	clear - few sperm	N
115553761A				7/7	7:15 a	80%	2% - looks OK	N
115553761A				7/7	9:00 a	100%	2% - looks good	N
7F7B023253		7/5	10:30a	7/7	9:00 a	-	clear - no sperm	N
1F482F3F2B		7/5	10:30a	7/7	9:00 a	-	clear - no sperm	N
115553761A				7/7	11:45 a	100%	2% - looks good	Y
1F482F3F2B				7/7	11:45 a	-	clear - no sperm	N
7F7B023253				7/7	11:45 a	40%	1% - pink	N
115553761A				7/7	2:00 p	-	2% - pink	N
1F482F3F2B				7/7	2:00 p	-	clear - no sperm	N
7F7B023253				7/7	2:00 p	5%	1% - poor	N
115553761A				7/7	4:00 p	100%	2% - looks good	N
7F7B023253	30 mls			7/7	9:30 p	1%	1% - poor	N

Table 5. 2005 Pallid Sturgeon Progeny Growth

Female	Male	August 3-16		Sept 14 Fish Health		Nov 28 Stocking		April 4 Stocking	
		num	grams	num	grams	num	gram*	num	Kg
115676635A	7F7B031F17	1243	405	6	25.4	320	15456	318	26.7
(GAP)	1F50072169	807	195	6	18.0	320	12576	325	17.9
	7F7D2D723D	1121	285	6	20.5	320	13344	318	15.9
TOTAL		3171	885	18	63.9	960	41376	961	60.5
WEIGHT (LBS)		1.95		0.141		91.14		133.20	
NUMBER/POUND		1626.7		126.1		10.5		7.2	
LENGTH (IN)		1.6		3.6		8.8		10.0	
115557165A	7F7B031F17	1766	626	6	21.1	320	18464	321	26.7
(GAP)	1F50072169	1395	371	6	19.0	319	8262	317	19.8
	7F7D2D723D	1659	494	6	15.3	319	5646	326	19.2
TOTAL		4820	1491	18	55.4	958	32372	964	65.7
WEIGHT (LBS)		3.28		0.122		71.30		144.90	
NUMBER/POUND		1467.7		126.1		13.4		6.7	
LENGTH (IN)		1.7		3.6		8.1		10.2	
4443240458	115633183A	1471	855	6	27.4	319	16684	277	20.7
(MC)	444334021A	1506	866	6	28.7	315	13167	271	21.0
TOTAL		2977	1721	11	56.1	634	29851	548	41.7
WEIGHT (LBS)		3.79		0.124		66		92	
NUMBER/POUND		785.3		97.4		9.6		6.0	
LENGTH (IN)		2.1		4.1		9.0		10.6	
Female	Male	Oct 12		Oct 18		Nov 28		April 4	
7F7B026102	115553761A	36	197	99	928	874	22549	756	46.2
	7F7B023253	24	150	100	728	781	16870	767	29.6
TOTAL		60	347	199	1656	1655	39419	1523	75.8
WEIGHT (LBS)		0.764		3.65		87		167	
NUMBER/POUND		82.5		54.6		19.1		9.1	
LENGTH (IN)		4.8		5.1		7.2		9.2	

* Nov 28 weight based on a representative 3-7 fish sample

Table 6. Fall 2005 Stocking (October 13 & 19 and Nov 2). All fish yellow elastomer tagged (plus stock site) with CWT.

Family		Total Number	Weight (lbs)	#/lb	Length (inches)	Wolf Point		Culbertson		Milk		Intake		Sidney	
♀	♂					Pink		Orange		Blue		Yellow		Red	
						#	lbs	#	lbs	#	lbs	#	lbs	#	lbs
4443240458	444334021A	1011	23.55	46	5.4	293	6.3	293	6.3	141	3.0	175	3.8	109	2.3
4443240458	115633183A	1014	19.85	54	5.1	275	5.1	275	5.1	130	2.4	229	4.3	105	2.0
115676635A	7F7B031F17	786	16.15	52	5.2	228	4.4	171	3.3	109	2.1	194	3.7	84	1.6
115676635A	1F50072169	305	4.95	74	4.6	78	1.0	59	0.8	48	0.6	83	1.1	37	0.5
115676635A	7F7D2D723D	559	10.85	62	4.9	181	2.9	100	1.6	97	1.6	114	1.8	67	1.1
115557165A	7F7B031F17	1074	20.50	54	5.1	300	5.5	250	4.6	150	2.8	263	4.9	111	2.1
115557165A	1F50072169	848	11.20	80	4.5	148	1.8	273	3.4	110	1.4	207	2.6	110	1.4
115557165A	7F7D2D723D	888	14.05	69	4.7	246	3.5	315	4.5	60	0.9	237	3.4	30	0.4
7F7B026102	115553761A	1158	14	83	4.4	315	3.8	315	3.8	151	1.8	268	3.2	109	1.3
*7F7B026102	115553761A	1255	25	50	5.3	331	6.7	336	6.7	334	6.6	254	7.0	0	0.0
7F7B026102	7F7B023253	0	0	82	4.4	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
*Runt	Mix	216	4	52	5.3							96	1.8	120	2.3
	Total	9114	164.53	55	5.0	2395	41.2	2387	40.2	1330	23.2	2120	35.8	882	15.0

Milk, Wolf Point and Culbertson were stocked on October 13 with female family lots 0458, 635A and 165A
All sites were stocked on Oct 19 with all female lots
*November 2 stocking included all sites from the non-uv treatment tanks as well as the runt lot
All fish were coded wire tagged and elastomer tagged - year class mark - yellow (parallel right) and stocking location (perpendicular left)

Table 7. Spring 2006 Stockings (April 4 & 5, 2006). All fish yellow Elastomer (RP) with PIT*.

♀	♂	Number	Wt (lbs)	Number per lb	Length (inches)	Intake		Sidney		Milk		Wolf Point		Culbertson	
						#	lbs	#	lbs	#	lbs	#	lbs	#	lbs
635A	1F17	318	58.8	5.4	11.0	80	14.30	26	4.80	72	12.95	70	12.61	70	14.11
635A	2169	325	39.4	8.2	9.5	80	7.05	27	3.95	78	10.60	70	9.04	70	8.77
635A	723D	318	35.0	9.1	9.2	80	5.08	26	3.20	62	7.62	80	10.59	70	8.47
165A	1F17	321	58.9	5.5	10.9	80	16.25	26	4.90	75	15.60	70	7.64	70	14.49
165A	2169	317	43.7	7.3	9.9	98	14.80	26	3.75	90	11.54	70	8.90	33	4.72
165A	723D	326	42.3	7.7	9.8	80	12.25	26	4.05	80	9.30	70	7.01	70	9.70
0458	021A	277	45.6	6.1	10.6	14	2.10	0	0.00	183	29.90	25	4.30	55	9.30
0458	183A	271	46.3	5.9	10.7	66	10.20	26	4.40	62	10.56	57	10.80	60	10.32
6102	761A	756	101.8	7.4	9.9	200	21.20	67	6.85	135	16.55	180	25.62	174	31.60
6102	3253	767	65.3	11.7	8.5	190	17.30	63	4.80	170	14.90	172	15.11	172	13.20
TOTAL		3996	537.1	7.4	9.9	968	120.53	313	40.70	1007	139.52	864	111.62	844	124.68
Elastomer only		303				68		39		78		22		96	

* Fish smaller than 7 inches have a yellow RP elastomer mark only.

Table 8. Survival Summary

♀	♂	Tanks	Number March 30, 2006	Number at Hatch	Research *	Fish stocked	Garrison Dam NFH Mortality Records										% Surv from hatch	% Surv last 6 months
							Jun	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar		
635A	1F17	71, 72, 73	318	1580	8	786	30	322	96	13	0	0	0	1	0	0	71%	100%
635A	2169	62, 63, 67	325	1605	6	305	19	772	105	16	0	0	0	0	0	0	43%	100%
635A	723D	74, 75, 79	318	1622	9	559	3	472	212	7	0	0	0	0	0	0	57%	100%
165A	1F17	60, 61, 68	321	1984	311	1074	25	200	35	1	0	0	0	0	0	0	87%	100%
165A	2169	64, 65, 69, 28	317	1862	8	848	20	430	116	24	1	0	1	0	1	0	68%	99%
165A	723D	70, 76, 77, 27	326	1999	191	888	7	306	216	34	0	1	0	0	0	0	72%	100%
0458	021A	56,78,80	317	4051	211	1011	2184	281	37	6	1	0	0	1	0	0	38%	99%
0458	183A	55,66,82	311	2383	88	1014	276	593	48	43	4	1	0	0	0	0	60%	98%
6102	761A	50,51,52,N8 59, 83, 26	796	23688**	2052	2205	-	5971	934	45	4	1	4	4	4	1	71%	98%
6102	3253	53,54,57,58, 81,S8, 29, 30	767	4205**	115	0	-	507	1122	8	2	1	0	1	6	3	61%	98%
6102	761A	18-26 (study)	0	445	0	424				17	4	-	-	-	-	-	95%	0%
MIX	MIX	S8	0	286	0	218			8	55	5	-	-	-	-	-	76%	0%
Totals			4116	45710	2999	9332	2564	9854	2929	269	21	4	5	7	11	4	66%	99%

* RESEARCH - 50 each family 6102 to genetics study - Pat DeHaan * 40 gram samples at hatch (1920 fry-6102X761A), 30 days(121 fing.165AX1F17), 60 days (34 fing. 6102X761A), 90 days (6 fish) to Matt Toner - fin curl study * 648 fingerlings to USGS/BRD Upper Midwest Research Center on 8/25 (202 - 0458 X 021A, 80-0458 X 183A, 181-165A X 1F17, 185-165A X 723D) * 30 fish diagnostic test 6102X3253 * 6 fish sample per family (except 6102) for health assessment Sept 15* 6 fish sample 6102 female lots for health assessment Oct 3 * 60 non-uv sample 36 from 6102 X 761A and 24 from 6102 X 3253 * 20 fish sample March 22, 2006 FHC - 7 family lots

* *13,272 fry destroyed surplus to stocking plan (11,598 from 6102 X 761A and 1,674 from 6102 X 3253)

Table 9. September 1 Density Index

Tank	Female ♀	Male ♂	Inventory number	Length (in)	Weight (lbs)	Tank Density	Monthly mortality	Transfer out	% Survival
50	6102	761A	435	3.2	1.99557	0.10	2	0	99.5%
51	6102	761A	436	3.2	2.00016	0.10	6	0	98.6%
52	6102	761A	447	3.2	2.05062	0.10	2	0	99.6%
53	6102	3253	157	3.2	0.72024	0.04	2	0	98.7%
54	6102	3253	181	3.2	0.83034	0.04	1	0	99.4%
55	0458	183A	531	4.1	5.12359	0.26	20	391	96.2%
56	0458	021A	525	4.1	5.06569	0.26	5	400	99.0%
57	6102	3253	360	3.2	1.65151	0.08	5	80	98.6%
58	6102	3253	327	3.2	1.50012	0.08	0	0	100.0%
59	6102	761A	509	3.2	2.33505	0.12	2	0	99.6%
60	165A	1F17	554	3.6	3.61864	0.18	1	3	99.8%
61	165A	1F17	552	3.6	3.60558	0.18	0	5	100.0%
62	635A	2169	362	3.6	2.36453	0.12	6	29	98.3%
63	635A	2169	397	3.6	2.59314	0.13	10	106	97.5%
64	165A	2169	535	3.6	3.49453	0.18	11	28	97.9%
65	165A	2169	436	3.6	2.84788	0.15	9	29	97.9%
66	0458	183A	540	4.1	5.21043	0.27	15	405	97.2%
67	635A	2169	0	3.6	0.00000	0.00	0	0	
68	165A	1F17	349	3.6	2.27961	0.18	0	15	100.0%
69	165A	2169	363	3.6	2.37106	0.19	4	33	98.9%
70	165A	723D	325	3.6	2.12285	0.17	8	3	97.5%
71	635A	1F17	0	3.6	0.00000	0.00	0	0	
72	635A	1F17	608	3.6	3.97136	0.20	8	87	98.7%
73	635A	1F17	586	3.6	3.82766	0.20	5	3	99.1%
74	635A	723D	526	3.6	3.43575	0.18	1	10	99.8%
75	635A	723D	513	3.6	3.35083	0.17	6	107	98.8%
76	165A	723D	511	3.6	3.33777	0.17	13	14	97.5%
77	165A	723D	518	3.6	3.38349	0.17	13	17	97.5%
78	0458	021A	546	4.1	5.26832	0.27	0	426	100.0%

Tank	Female ♀	Male ♂	Inventory number	Length (in)	Weight (lbs)	Tank Density	Monthly mortality	Transfer out	% Survival
79	635A	723D	0	3.6	0.00000	0.00	0	0	
80	0458	021A	351	4.1	3.38678	0.27	1	270	99.7%
81	6102	3253	0	3.2	0.00000	0.00	0	0	
82	0458	183A	351	4.1	3.38678	0.27	8	263	97.7%
83	6102	761A	0	3.2	0.00000	0.00	0	0	
S8	6102	3253	0	3.2	0.00000	0.00	0	0	
N8	6102	761A	0	3.2	0.00000	0.00	0	0	
G8				0.0	0.00000	0.00			
1	6102	761A	197	3.2	0.90374	0.18	3	60	98.5%
2	6102	761A	191	3.2	0.87622	0.18	4	53	97.9%
3	6102	761A	208	3.2	0.95420	0.19	5	69	97.6%
4	6102	761A	203	3.2	0.93127	0.19	4	66	98.0%
5	6102	761A	137	3.2	0.62849	0.13	3	0	97.8%
6	6102	761A	192	3.2	0.88080	0.18	4	54	97.9%
7	6102	761A	190	3.2	0.87163	0.18	8	52	95.8%
8				0.0	0.00000	0.00	0	0	
9				0.0	0.00000	0.00	0	0	
10				0.0	0.00000	0.00	0	0	
11				0.0	0.00000	0.00	0	0	
12	6102	761A	167	3.2	0.76612	0.16	2	34	98.8%
13				0.0	0.00000	0.00	0	0	
14				0.0	0.00000	0.00	0	0	
15				0.0	0.00000	0.00	0	0	
16	runt	mix	247	3.2	1.13312	0.23	55	108	77.7%
17				0.0	0.00000	0.00	0	0	
18	6102	761A	50	3.2	0.22938	0.05	0	0	100.0%
19	6102	761A	50	3.2	0.22938	0.05	3	0	94.0%
20	6102	761A	50	3.2	0.22938	0.05	2	0	96.0%
21	6102	761A	50	3.2	0.22938	0.05	0	0	100.0%
22	6102	761A	50	3.2	0.22938	0.05	3	0	94.0%
23	6102	761A	50	3.2	0.22938	0.05	1	0	98.0%

Tank	Female ♀	Male ♂	Inventory number	Length (in)	Weight (lbs)	Tank Density	Monthly mortality	Transfer out	% Survival
24	6102	761A	50	3.2	0.22938	0.05	4	0	92.0%
25	6102	761A	50	3.2	0.22938	0.05	0	0	100.0%
26	6102	761A	50	3.2	0.22938	0.05	4	0	92.0%
27				0.0	0.00000	0.00	0	0	
28				0.0	0.00000	0.00	0	0	
29				0.0	0.00000	0.00	0	0	
30				0.0	0.00000	0.00	0	0	
Totals / Averages			15013		0.0000		269	3220	98.2%

Table 10. Tank Density Pre-stocking mid October and Nov 1

Tank	Female ♀	Male ♂	Pre stocking number	Target Number	Length (in)	Weight (lbs)	Prestock Density
50	6102	761A	411	120	4.6	5.70	0.29
51	6102	761A	469	120	4.5	6.12	0.31
52	6102	761A	353	120	4.4	4.21	0.21
53	6102	3253	108	120	4.4	1.29	0.07
54	6102	3253	120	120	4.4	1.43	0.07
55	0458	183A	118	120	5.1	2.19	0.11
56	0458	021A	119	120	5.4	2.62	0.13
57	6102	3253	66	120	4.0	0.59	0.03
58	6102	3253	123	120	4.2	1.28	0.07
59	6102	761A	482	120	5.1	8.83	0.45
60	165A	1F17	550	120	5.1	10.21	0.52
61	165A	1F17	537	120	5.1	9.97	0.51
62	635A	2169	327	120	4.6	4.46	0.23
63	635A	2169	281	120	4.6	3.83	0.20
64	165A	2169	496	120	4.5	6.33	0.32
65	165A	2169	398	120	4.5	5.08	0.26
66	0458	183A	120	120	5.1	2.23	0.11
67	635A	2169	80	80	4.6	1.09	0.06
68	165A	1F17	80	80	5.1	1.49	0.08
69	165A	2169	80	80	4.5	1.02	0.05
70	165A	723D	275	80	4.7	4.00	0.20
71	635A	1F17	80	80	5.2	1.57	0.08
72	635A	1F17	513	120	5.2	10.10	0.52
73	635A	1F17	578	120	5.2	11.38	0.58
74	635A	723D	515	120	4.9	8.48	0.43
75	635A	723D	400	120	4.9	6.59	0.34
76	165A	723D	484	120	4.7	7.04	0.36
77	165A	723D	488	120	4.7	7.09	0.36
78	0458	021A	120	120	5.4	2.65	0.14

Tank	Female ♀	Male ♂	Pre stocking number	Target Number	Length (in)	Weight (lbs)	Prestock Density
79	635A	723D	80	80	4.9	1.32	0.07
80	0458	021A	80	80	5.4	1.76	0.09
81	6102	3253	80	80	4.4	0.95	0.05
82	0458	183A	78	80	6.0	2.36	0.12
83	6102	761A	80	80	6.0	2.42	0.12
S8	6102	3253	315	315	4.5	4.10	0.21
N8	6102	761A	315	315	4.1	3.05	0.16
G8							0.00
1	6102	761A	73	73	5.4	1.60	0.33
2	6102	761A	73	73	5.4	1.65	0.34
3	6102	761A	74	74	5.3	1.50	0.31
4	6102	761A	70	70	5.5	1.60	0.33
5	6102	761A	70	70	5.5	1.60	0.33
6	6102	761A	69	69	5.4	1.55	0.32
7	6102	761A	70	70	5.6	1.70	0.35
8							0.00
9	6102	761A	69	69	5.6	1.70	0.35
10							0.00
11	6102	761A	69	69	5.5	1.60	0.33
12	6102	761A	69	69	5.4	1.50	0.31
13	6102	761A	68	68	5.4	1.50	0.31
14	6102	761A	61	61	5.5	1.45	0.30
15							0.00
16	runt	mix	109	109	4.0	1.00	0.20
17	runt	mix	109	109	4.0	1.00	0.20
18	6102	761A	50	50	5.2	1.00	0.20
19	6102	761A	47	47	4.8	0.75	0.15
20	6102	761A	47	47	4.5	0.60	0.12
21	6102	761A	46	46	4.9	0.75	0.15

Tank	Female ♀	Male ♂	Pre stocking number	Target Number	Length (in)	Weight (lbs)	Prestock Density
22	6102	761A	43	43	4.5	0.55	0.11
23	6102	761A	47	47	4.5	0.60	0.12
24	6102	761A	48	48	4.1	0.48	0.10
25	6102	761A	49	49	4.6	0.66	0.13
26	6102	761A	47	47	4.8	0.75	0.15
1	6102	761A	60	60	4.6	0.80	0.16
2	6102	761A	117	117	4.5	1.45	0.30
3	6102	761A	126	126	4.6	1.70	0.35
4	6102	761A	134	134	3.7	0.95	0.19
5	6102	761A	134	134	5.4	2.96	0.60
6	6102	761A	123	123	5.4	2.70	0.55
7	6102	761A	121	121	5.4	2.60	0.53
9	6102	761A	125	125	5.3	2.55	0.52
11	6102	761A	123	123	5.3	2.55	0.52
12	6102	761A	116	116	5.3	2.44	0.50
S8	0458	021A	1087	1087	6.0	9.53	0.49
N8	0458	183A	1048	1048	6.0	9.53	0.49
G8	runt	mix	216	216	6.0	6.53	0.33
Totals / Averages			14806	6090	4.8	228.2	

Table 11. Tank Density (December and April)

Tank	Female ♀	Male ♂	Dec 1 #	Length (in)	Weight (lbs)	Density	April 4 #	Length (in)	Weight (lbs)	Density
50-B5	6102	761A	120	7.7	7.7	0.39	85	9.6	10.4	0.53
51-B4	6102	761A	119	7.7	7.6	0.39	66	9.4	7.6	0.39
52-B3	6102	761A	120	7.7	7.7	0.39	104	8.5	9.0	0.46
53-B2	6102	3253	96	6.9	4.4	0.28	94	9.0	9.5	0.48
54-B1	6102	3253	107	6.9	4.9	0.28	80	8.2	6.1	0.31
55-A1	0458	183A	117	9.5	14.0	0.73	85	9.9	11.7	0.60
56-A2	0458	021A	119	8.7	11.0	0.56	85	10.0	11.9	0.61
57-A3	6102	3253	63	6.9	2.9	0.28	48	8.7	4.4	0.22
58-A4	6102	3253	120	6.9	5.5	0.28	108	8.7	9.9	0.51
59-A5	6102	761A	120	7.7	7.7	0.39	84	9.7	10.9	0.56
60-F1	165A	1F17	120	9.2	13.1	0.67	88	11.3	17.9	0.91
61-F2	165A	1F17	120	9.2	13.1	0.67	82	11.1	15.8	0.81
62-F3	635A	2169	120	8.2	9.3	0.47	122	9.9	16.6	0.85
63-F4	635A	2169	120	8.2	9.3	0.47	122	9.7	15.6	0.80
64-F5	165A	2169	119	7.2	6.2	0.32	112	9.9	15.1	0.77
65-F6	165A	2169	120	7.2	6.3	0.32	109	9.7	14.1	0.72
66-F7	0458	183A	120	9.5	14.4	0.73	81	11.0	15.1	0.77
67-F8	635A	2169	80	8.2	6.2	0.49	81	8.6	7.2	0.57
68-F9	165A	1F17	80	9.2	8.7	0.69	56	9.1	6.0	0.48
69-F10	165A	2169	80	7.2	4.2	0.33	80	10.8	14.0	1.11
70-F11	165A	723D	80	6.3	2.8	0.22	80	10.3	12.3	0.98
71-F12	635A	1F17	80	9.1	8.4	0.67	54	10.8	9.5	0.75
72-E1	635A	1F17	120	9.1	12.7	0.65	86	11.0	15.8	0.81
73-E2	635A	1F17	120	9.1	12.7	0.65	83	11.3	16.6	0.85
74-E3	635A	723D	120	8.7	11.1	0.56	117	9.5	13.9	0.71
75-E4	635A	723D	120	8.7	11.1	0.56	121	9.8	16.0	0.82
76-E5	165A	723D	119	6.3	4.2	0.21	114	10.2	16.9	0.86
77-E6	165A	723D	120	6.3	4.2	0.21	118	9.1	12.6	0.64

Tank	Female ♀	Male ♂	Dec 1 #	Length (in)	Weight (lbs)	Density	April 4 #	Length (in)	Weight (lbs)	Density
78-E7	0458	021A	120	8.7	11.1	0.56	85	10.7	14.7	0.75
79-E8	635A	723D	80	8.7	7.4	0.59	80	7.7	5.1	0.40
80-E9	0458	021A	80	8.7	7.4	0.59	52	11.3	10.5	0.83
81-E10	6102	3253	80	6.9	3.7	0.29	70	8.8	6.7	0.53
82-E11	0458	183A	78	9.5	9.4	0.76	55	10.9	9.9	0.79
83-E12	6102	761A	80	7.7	5.1	0.41	68	10.0	9.6	0.76
S8	6102	3253	315	6.9	14.5	0.29	307	8.6	27.1	0.54
N8	6102	761A	315	7.7	20.1	0.40	212	11.0	39.2	0.78
A6	165A	1F17					95	11.3	19.2	0.38
A7	0458	021A					95	10.2	14.1	0.72
A8	6102	761A					85	9.3	9.6	0.49
B6	635A	1F17					95	10.8	16.9	0.86
B7	0458	183A					90	10.6	15.1	0.77
B8	6102	761A					80	9.8	10.5	0.54
26	6102	761A					12	5.6	0.3	0.06
27	165A	723D					14	6.5	0.6	0.12
28	165A	2169					16	6.3	0.6	0.12
29	6102	3253					33	5.6	0.8	0.16
30	6102	3253					27	6.0	0.8	0.16
Totals / Averages			4235	6	128.1	0.35	4116	9.9	553.7	0.66

Table 12. Proposed Final Tank Distribution by Family Lot

Female ♀	Male ♂	Source	#'s	pounds of 7" fish	pounds of 8" fish	pounds of 9" fish	# of Tanks 4'	5'	8'	Density of 7 inch fish	Density of 8 inch fish	Density of 9 inch fish
635A	1F17	GAP	320	15.2	22.9	32.0	1	2	0	0.2942	0.4413	0.6178
635A	2169	GAP	320	15.2	22.9	32.0	1	2	0	0.2942	0.4413	0.6178
635A	723D	GAP	320	15.2	22.9	32.0	1	2	0	0.2942	0.4413	0.6178
165A	1F17	GAP	320	15.2	22.9	32.0	1	2	0	0.2942	0.4413	0.6178
165A	2169	GAP	320	15.2	22.9	32.0	1	2	0	0.2942	0.4413	0.6178
165A	723D	GAP	320	15.2	22.9	32.0	1	2	0	0.2942	0.4413	0.6178
0458	021A	MC	320	15.2	22.9	32.0	1	2	0	0.2942	0.4413	0.6178
0458	183A	MC	320	15.2	22.9	32.0	1	2	0	0.2942	0.4413	0.6178
6102	761A	GAD	515	24.5	36.8	51.5	1	1	1	0.2976	0.4464	0.6250
6102	3253	GAD	635	30.2	45.4	63.5	1	2	1	0.2965	0.4447	0.6225
6102	3253	GAD*	240	11.4	17.1	24.0	0	2	0	0.2915	0.4373	0.6122
6102	761A	GAD*	360	17.1	25.7	36.0	0	3	0	0.2915	0.4373	0.6122
Totals / Averages			4310	205.2	307.9	431.0	10	24	2	0.2945	0.4418	0.6185

* Non-UV treated tanks

Table 13. Growth Rates over the Year - Various Time Frames

Family	New Tank	Tank #	Number	Weight (lbs)	Length (in)	Date	Number	Weight (lbs)	Length (in)	Date	Growth inches/day	Growth mm/day
0458 X 021A	E9	78	35	6.4	10.9	1/25/2006	553	0.711	2.1	08/03/2005	0.0505	1.28
0458 X 021A	E9	78	52	10.5	11.3	4/4/2006	35	6.4	10.9	1/25/2006	0.0053	0.14
0458 X 021A	E11	80	25	4.6	11.0	1/25/2006	353	0.438	2.1	08/03/2005	0.0508	1.29
0458 X 021A	E7	78	18	3.0	10.6	2/21/2006	553	0.71	2.1	08/03/2005	0.0421	1.07
0458 X 021A	A2	56	34	4.3	9.7	1/25/2006	551	0.229	1.4	07/26/2005	0.0450	1.14
0458 X 183A	E11	82	23	4.4	11.1	1/25/2006	350	0.449	2.1	08/03/2005	0.0515	1.31
0458 X 183A	F7	66	35	6.8	11.2	1/25/2006	485	0.628	2.1	08/03/2005	0.0517	1.31
0458 X 183A	F7	66	485	0.628	2.1	08/03/2005	81	15.1	11.0	04/04/2006	0.0365	0.93
0458 X 183A	A1	55	32	4.4	9.9	1/25/2006	550	0.227	1.4	07/26/2005	0.0465	1.18
165A X 723D	E6	77	559	0.335	1.6	08/10/2005	118	12.6	9.1	04/04/2006	0.0315	0.80
165A X 723D	E5	76	554	0.388	1.7	08/10/2005	114	16.9	10.2	04/04/2006	0.0358	0.91
165A X 723D	F11	70	355	0.236	1.7	08/10/2005	80	12.3	10.3	04/04/2006	0.0364	0.92
165A X 1F17	F1	60	35	6.0	10.7	1/24/2006	554	0.443	1.8	08/12/2005	0.0540	1.37
165A X 1F17	F2	61	35	7.6	11.6	1/24/2006	554	0.443	1.8	08/12/2005	0.0593	1.51
165A X 1F17	F9	68	25	5.0	11.3	1/24/2006	355	0.258	1.7	08/12/2005	0.0578	1.47
165A X 2169	F6	65	24	3.0	9.6	2/21/2006	544	0.278	1.5	08/10/2005	0.0415	1.05
165A X 2169	F5	64	555	0.317	1.6	08/10/2005	112	15.1	9.9	04/04/2006	0.0350	0.89
165A X 2169	F10	69	386	0.222	1.6	08/10/2005	80	14.0	10.8	04/04/2006	0.0388	0.99
635A X 2169	F3	62	380	0.220	1.6	08/16/2005	122	16.6	9.9	04/04/2006	0.0359	0.91
635A X 2169	F4	63	305	4.949	4.9	10/03/2005	427	0.209	1.5	08/16/2005	0.0700	1.78

Family	New Tank	Tank #	Number	Weight (lbs)	Length (in)	Date	Number	Weight (lbs)	Length (in)	Date	Growth inches/day	Growth mm/day
635A X 723D	E3	74	564	0.341	1.6	08/11/2005	117	13.9	9.5	04/04/2006	0.0334	0.85
635A X 723D	E4	75	559	10.85	5.2	10/03/2005	557	0.286	1.5	08/11/2005	0.0686	1.74
635A X 1F17	F12	71	54	9.5	10.8	04/04/2006	25	4.6	11.0	1/24/2006	-0.0022	-0.06
635A X 1F17	E1	72	35	6.4	10.9	1/24/2006	86	15.8	11.0	04/04/2006	0.0010	0.03
635A X 1F17	E1	72	35	6.4	10.9	1/24/2006	3	0.021	8.5	09/14/2005	0.0184	0.47
635A X 1F17	E2	73	786	16.15	5.3	10/3/2005	608	0.445	1.7	08/12/2005	0.0681	1.73
635A X 1F17	E2	73	35	6.4	10.9	1/24/2006	608	0.445	1.7	08/12/2005	0.0557	1.42
6102 X 761A	B8	N8	85	11.0	9.7	1/25/2006	99	2.04	5.3	10/18/2005	0.0451	1.14
6102 X 761A	A8	N8	11	1.5	9.9	1/25/2006	99	2.04	5.3	10/18/2005	0.0468	1.19
6102 X 761A	B5	50	35	4.0	9.3	1/25/2006	85	10.4	9.6	04/04/2006	0.0037	0.09
6102 X 761A	B5	50	35	4.0	9.3	1/25/2006	14	1.8	9.7	2/21/2006	0.0139	0.35
6102 X 761A	B4	51	19	2.0	9.1	2/21/2006	874	49.67	7.4	11/28/2005	0.0199	0.50
6102 X 761A	A5	59	27	2.8	9.0	1/25/2006	99	2.04	5.3	10/18/2005	0.0381	0.97
6102 X 761A	E12	83	12	2.0	10.6	1/25/2006	874	49.67	7.4	11/28/2005	0.0551	1.40
6102 X 761A	D6	N8	311	38.5	9.6	1/12/2006	874	49.67	7.4	11/28/2005	0.0488	1.24
6102 X 3253	A3	57	16	1.0	7.6	2/21/2006	781	37.16	7.0	11/28/2005	0.0078	0.20
6102 X 3253	B1	54	21	1.4	7.8	2/21/2006	108	1.35	4.5	10/18/2005	0.0265	0.67
6102 X 3253	S8	S8	312	24.8	8.3	1/11/2006	781	37.16	7.0	11/28/2005	0.0296	0.75
6102 X 3253	A4	58	100	1.60	4.9	10/18/2005	108	9.9	8.7	04/04/2006	0.0229	0.58
										AVERAGE	0.0379	0.96

Appendix 1. Length Weight Samples (taken for histology September 14)

♀	♂	Tank #	Weight (g)	Length (cm)	Tank #	Weight (g)	Length (cm)	Tank #	Weight (g)	Length (cm)
635A	1F17	72	3.6	8.8	73	5.1	9.9			
635A	1F17	72	3.2	8.7	73	4.6	9.7			
635A	1F17	72	2.9	7.9	73	6.0	10.4			
635A	2169	62	3.9	9.6	63	3.1	8.6			
635A	2169	62	2.8	8.8	63	2.8	8.6			
635A	2169	62	2.4	8.3	63	3.0	8.4			
635A	723D	74	3.6	9.5	75	3.6	9.3			
635A	723D	74	3.5	9.3	75	5.1	11.0			
635A	723D	74	1.5	6.8	75	3.2	9.0			
Female Average			3.6	9.0						
165A	1F17	60	4.6	10.0	61	3.3	9.2	68	3.5	9.4
165A	1F17	60	3.1	8.9	61	4.1	9.9	68	2.5	8.3
165A	2169	64	4.3	9.9	65	2.8	8.3	69	4.7	10.2
165A	2169	64	1.5	6.6	65	2.8	8.4	69	2.9	8.8
165A	723D	70	1.8	7.4	76	3.5	9.6	77	3.8	9.8
165A	723D	70	1.9	7.5	76	2.4	8.0	77	1.9	7.4
Female Average			3.1	8.8						
0458	021A	56	5.2	11.2	78	4.2	10.1	80	5.2	10.8
0458	021A	56	1.8	7.4	78	6.7	11.7	80	5.6	10.9
0458	183A	55	6.1	12.1	66	6.1	11.7	82	5.6	10.9
0458	183A	55	2.1	7.9	66	4.8	10.6	82	2.7	8.7
Female Average			4.7	10.3						

Appendix 2. 2005 Hatchery Recaptures - Garrison Dam NFH only

PIT TAG	FEMALE PIT	MALE PIT	YEAR CLASS	STOCKING DATA				RECAPTURE DATA				GROWTH TRAVEL			
				LENGTH (mm)	STOCK SITE	RIVER MILE	DATE	LENGTH (mm)	WT (g)	RIVER MILE	DATE	GROWTH (mm)	GROWTH (mm/day)	DAYS AT LARGE	TRAVEL (RM)
4323236566	220E345E09	1F4A27214F	2001	170	BELLEVUE	601.4	4/11/02	195	15	594.5	5/29/02	25	0.5208	48	6.9
4310326D1E	7F7F06672B	7F7D3C5708	2001	210	BELLEVUE	601.4	4/11/02	243	44	593.2	6/11/02	33	0.5410	61	8.2
43140E2147	220E345E09	1F4A27214F	2001	190	BELLEVUE	601.4	4/11/02	223	36	593.5	6/11/02	33	0.5410	61	7.9
43102C5C10	220E345E09	1F4A27214F	2001	220	BOONVILLE	195.1	4/11/02	258	51	189.2	6/24/02	38	0.5135	74	5.9
43221F5145	411D262C1F	411D0E2C5F	2001	240	BOONVILLE	195.1	4/11/02	301	50	214.6	7/9/02	61	0.6854	89	19.5
435F076F55	411D262C1F	1F4A4B5973	2001	170	WOLF POINT	1701.5	7/26/02	178	22	1701	7/31/02	8	1.6000	5	0.5
435E697E26	411D262C1F	17509415139	2001	230	WOLF POINT	1701.5	7/26/02	239	47	1700	8/15/02	9	0.4500	20	1.5
435E6D6F77	411D262C1F	17509415139	2001	300	WOLF POINT	1701.5	7/26/02	322	102.6	1709.5	9/12/02	22	0.4583	48	8
435E1D160C	411D262C1F	41476A0462	2001	220	WOLF POINT	1701.5	7/26/02	231	38.2	1707	9/12/02	11	0.2292	48	5.5
435D675A10	411D262C1F	411D0B4E09	2001	220	WOLF POINT	1701.5	7/26/02	245	44.6	1698.5	9/17/02	25	0.4717	53	3
4327730832	220E345E09	1F4A111C6A	2001	200	BELLEVUE	601.4	4/11/02	298	60	588.7	9/24/02	98	0.5904	166	12.7
430F701C5C	7F7F06672B	7F7D3C5708	2001	170	BELLEVUE	601.4	4/11/02	353			5/22/03	183	0.4507	406	
435F374B37	411D262C1F	1F4A4B5973	2001		CULBERTSON	1621	7/26/02	271	56	1600	7/14/03			353	21
435D7C2C72	411D262C1F	411D0E2C5F	2001	300	FAIRVIEW	9	7/26/02		326	1583	7/15/03			354	11
435F40670D	411D262C1F	4147640462	2001	290	SIDNEY	31	7/26/02	326	97	1583	7/15/03	36	0.1017	354	33
435F483B01	411D262C1F	1F4A4B5873	2001	210	FAIRVIEW	9	7/26/02	394	90	1583	7/15/03	184	0.5198	354	11
435E661632	411D262C1F	17509415139	2001	260	SIDNEY	31	7/26/02	326	102	1581.5	7/15/03	66	0.1864	354	31.5
435E785873	411D262C1F	17509415139	2001	260	FAIRVIEW	9	7/26/02	323	90	1581.5	7/15/03	63	0.1780	354	9.5
435F414B46	411D262C1F	17509415139	2001	320	SIDNEY	31	7/26/02	373	155	1581.5	7/15/03	53	0.1497	354	31.5
435F40370	411D262C1F	41476A0462	2001	260	INTAKE	70	7/26/02	329	100	1583	7/15/03	69	0.1949	354	72
435D7E3320	411D262C1F	41476A0462	2001	280	SIDNEY	31	7/26/01	323	95	1581.5	7/15/03	43	0.0598	719	31.5
4313383748	411D262C1F	17509415139	2001	180	VERDEL, NE	855	4/21/02	420	244	833	8/4/03	240	0.5106	470	22
435E567F56	411D262C1F	41476A0462	2001	270	WOLF POINT	1701.5	7/26/02	302	69	1698.5	8/5/03	32	0.0853	375	3
431B497735	411D262C1F	1F4A4B5973	2001	200	VERDEL, NE	855	4/21/02	360	150	847	8/6/03	160	0.3390	472	8
4313581509	411D262C1F	41476A0462	2001	220	VERDEL, NE	855	4/21/02	415	218	862	8/12/03	195	0.4080	478	7
435E3D373B	411D262C1F	411D0E2C5F	2001	270	SIDNEY	31	7/26/02	321	88.5	1	8/13/03	51	0.1332	383	30
431A1B2A43	411D262C1F	17509415139	2001	240	VERDEL,NE	855	4/21/02	420	220	862.5	8/13/03	180	0.3758	479	7.5
435E436639	411D252C1F	41476A0462	2001	260	FAIRVIEW	9	7/26/02	318	94.5	1581	9/5/03	58	0.1429	406	9
435F391C01	411D262C1F	411D0E2C5F	2001	240	SIDNEY	31	7/26/02	307	87.3	1581	9/5/03	67	0.1650	406	31
435F062F38	411D252C1F	17509415139	2001	240	FAIRVIEW	9	7/26/03	335	~100	1581.5	9/9/03	95	2.1111	45	9.5
435D2B1A53	411D252C1F	41476A0462	2001	240	SIDNEY	31	7/26/03	310	~100	1581.5	9/9/03	70	1.5556	45	31.5
435D79042F	411D262C1F	41476A0462	2001	260	INTAKE	70	7/26/02	337	127	1643.5	10/14/03	77	0.1730	445	132.5
4443502F1C	116224546A	7F7D461025	2001	297	BOONVILLE	195.1	7/16/03	392		221	2/24/04	95	0.4260	223	25.9
4323482363	220E345E09	1F4A111C6A	2001	220	VERDEL	855	4/21/02	385	142	855	4/22/04	165	0.2254	732	0
43110E6863			2001		BOONVILLE	195.1	12/2/03	186		130.1	4/28/04	186	1.2568	148	65
R-PINK			2001				12/2/03	248	320	448.5	6/29/04			210	448.5
R-PINK			2001				12/2/03	306	80	142.8	7/9/04			220	142.8
435E1E2E44	411D262C1F	411D0E2C5F	2001	300	WOLF POINT	1701.5	7/26/02	339	114	1596	7/13/04	39	0.0543	718	105.5
435650783A	411D262C1F	41476A0462	2001	280	INTAKE	70	7/26/02	357	130	1588	7/13/04	77	0.1072	718	77
431C3B023A	411D262C1F	41476A0462	2001	210	VERDEL	855	4/21/02	362	145	1588	7/13/04	152	0.1867	814	733
431B302371	411D262C1F	41476A0462	2001	210	VERDEL	855	4/21/02	409	194	448	7/20/04	199	0.2424	821	407
431C7A291D	220E345E09	1F4A111C6A	2001	210	VERDEL	855	4/21/02	458	326	843	7/23/04	248	0.3010	824	12
44416B4F4E	116224546A	220F107A6F	2002	280	BOONVILLE	195.1	7/16/03	470	310	281.4	8/2/04	190	0.4961	383	86.3

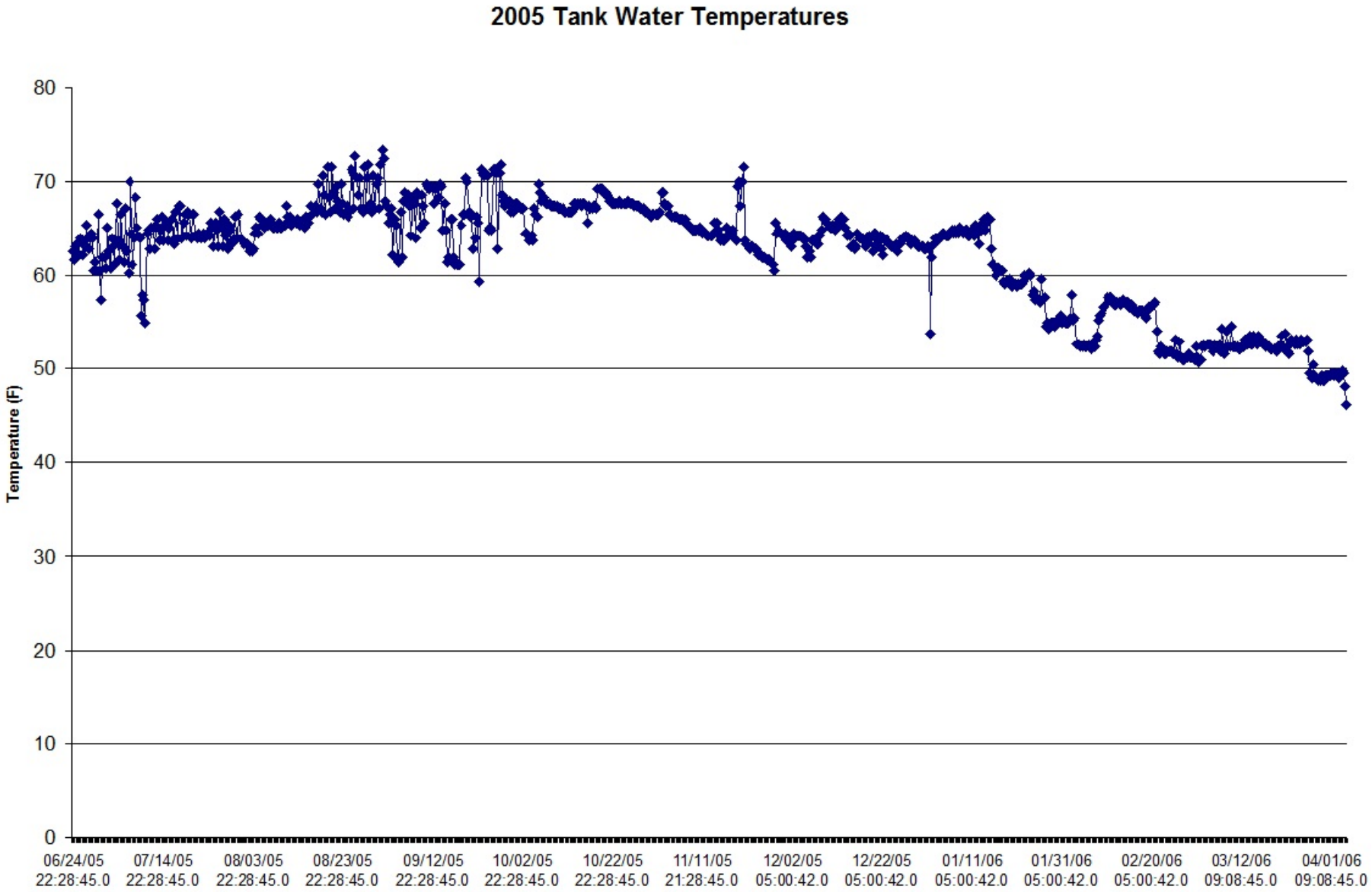
PIT TAG	FEMALE PIT	MALE PIT	YEAR CLASS	STOCKING DATA				RECAPTURE DATA				GROWTH TRAVEL			
				LENGTH (mm)	STOCK SITE	RIVER MILE	DATE	LENGTH (mm)	WT (g)	RIVER MILE	DATE	GROWTH (mm)	GROWTH (mm/day)	DAYS AT LARGE	TRAVEL (RM)
435F1A4E56	411D262C1F	17509415139	2001	290	WOLF POINT	1701.5	7/26/02	328	115	1624.5	8/5/04	38	0.0513	741	77
44225C3505	7F7F054855	115675486A	2003	221	BOONVILLE	195.1	7/8/04	250		192.7	8/9/04	29	0.9063	32	2.4
435F4D316B	411D262C1F	41476A0462	2001	250	WOLF POINT	1701.5	7/26/02	298	50	1701.5	9/27/04	48	0.0605	794	0
435E123D76	411D262C1F	411D0B4E09	2001	170	SIDNEY	31	7/26/02	330	116	26	9/28/04	160	0.2013	795	5
452E724106			2001				7/26/02	350	160	26	9/28/04			795	
435F001768	411D262C1F	411D0B4E09	2001	260	SIDNEY	31	7/26/02	366	155	26	9/28/04	106	0.1333	795	5
452F527E43	220E345E09	1F4A27214F	2001				7/26/02	332		26	9/29/04			796	26
431B29450A			2001	220	BOONVILLE	195.1	4/11/02	529	500	227.9	9/29/04	309	0.3426	902	32.8
435E267962	411D262C1F	41476A0462	2001	240	SIDNEY	31	7/26/02	425	280	26	9/30/04	185	0.2321	797	5
435D683509	411D262C1F	41476A0462	2001	280	FAIRVIEW	9	7/26/02	373	148	5.5	10/5/04	93	0.1160	802	3.5
435E267962	411D262C1F	41476A0462	2001	240	SIDNEY	31	7/26/02	426	250	26	10/6/04	186	0.2316	803	5
R-PINK			2003					111		551.5	10/12/04				
L-RED			2004				9/10/04	133		193.2	10/13/04			33	
4445484427	116224546A	1F477B3A65	2002	259	BOONVILLE	195.1	7/16/03	427	226	222.9	10/21/04	168	0.3629	463	27.8
4356332A0C	411D262C1F	41476A0462	2001	260	WOLF POINT	1701.5	7/26/02	323	100	1701	10/24/04	63	0.0767	821	0.5
435D133F45	411D262C1F	41476A0462	2001	320	WOLF POINT	1701.5	7/26/02	350	135	1649.5	10/27/04	30	0.0364	824	52
43211C3E14	220E345E09	1F4A111C6A	2001	220	BOONVILLE	195.1	4/11/02	631	794	395.5	11/3/04	411	0.4386	937	200.4
4444400077	116224546A	7F7D461025	2002	316	BELLEVUE	601.4	7/16/03	373	158	681.6	11/17/04	57	0.1163	490	80.2
44425B6828	116224546A	7F7D461025	2002	311	BOONVILLE	195.1	7/16/03	405	235	111.7	3/24/05	94	0.1524	617	83.4
44443C5205	116224546A	7F7D461025	2002	303	BOONVILLE	195.1	7/16/03	422	190	204.5	4/4/05	119	0.1895	628	9.4
432C385722	411D262C1F	41476A0462	2001	220	ST. HELENA,NE	799	4/3/02			719	4/6/05			1099	80
4356637157	411D262C1F	411D0E2C5F	2001	280	SIDNEY	31	7/26/02	341	150	7	5/3/05	61	0.0603	1012	24
435D705548	411D262C1F	17509415139	2001	330	FAIRVIEW	9	7/26/02	413	250	1582	5/4/05	83	0.0819	1013	10
4445303A06	116224546A	7F7D461025	2002	345	MULLBERRY	775	7/16/03	396	158	663.3	5/9/05	51	0.0769	663	111.7
452F055757			2001				7/26/02	428	258	25	5/10/05			1019	
435D741F4F	411D262C1F	411D0E2C5F	2001	300	SIDNEY	31	7/26/02	401		12	5/18/05	101	0.0983	1027	19
4423777D6D	7F7F054855	115669540A	2003	168	BELLEVUE	601.4	7/8/04	239		556.1	5/23/05	71	0.2226	319	45.3
4313624771	220E345E09	1F4A27214F	2001	180	MULLBERRY	775	4/11/02	370	132	529	6/1/05	190	0.1657	1147	246
4319637068	411D262C1F	1F4A4B5973	2001	170	VERDEL, NE	855	4/21/02	417	240	851	6/21/05	247	0.2135	1157	4
4322447456	411D262C1F	411D0E2C5F	2001	180	VERDEL, NE	855	4/21/02	393	220	851	6/21/05	213	0.1841	1157	4
4443742662	116224546A	220F107A6F	2002	339	BOONVILLE	195.1	7/16/03	488	360	217.2	6/21/05	149	0.2110	706	22.1
R-GREEN			2001					416	300	10.5	6/22/05				
44432E5C29	7B7B016070	41475D3C5D	2003	173	BELLEVUE	601.4	7/8/04	268	62	589	6/30/05	95	0.2661	357	12.4
44433B2708	132256586A	132114552A	2003	245	LEAVENWORTH	397	7/8/04	380	188	509.8	7/12/05	135	0.3659	369	112.8
453666382B			2001					382	188	5.5	7/18/05				
44434B447F	7B7B016070	41475D3C5D	2003	282	BELLEVUE	601.4	7/8/04	377	138	564.2	7/19/05	95	0.2527	376	37.2
	114476216A	7F7E55466D	2004				9/10/04	210	31	1575.8	7/19/05			312	
	114476216A	7F7E55466D	2004				9/10/04	190	24	1575.5	7/19/05			312	
435E236E09	411D262C1F	41476A0462	2001	290	INTAKE	70	7/26/02	374		0.5	7/20/05	84	0.0771	1090	69.5
435E636C5C	411D262C1F	411D0B4E09	2001	230	SIDNEY	31	7/26/02	370		2	7/26/05	140	0.1277	1096	29
44435B2150	116224546A	1F477B3A65	2002	321	MULLBERRY	775	7/16/03	407	194	625	7/26/05	86	0.1161	741	150
4444437234	116224546A	220F107A6F	2002	301	BELLEVUE	601.4	7/16/03	450	260	345.8	7/26/05	149	0.2011	741	255.6
444407514D	116224546A	220F107A6F	2002	296	MULLBERRY	775	7/16/03	421	239	711	8/9/05	125	0.1656	755	64
430F7F6515	411D262C1F	41476A0462	2001	180	VERDEL, NE	855	4/21/02	438	245	852.5	8/10/05	258	0.2138	1207	2.5
430F7F6515	411D262C1F	41476A0462	2001	180	VERDEL	855	4/21/02	438	245	852.5	8/10/05	258	0.2138	1207	2.5
			2004					210	28	1561.2	8/10/05				-19.8
4323491B4C	411D262C1F	411D0E2C5F	2001	180	VERDEL NE	855	4/21/02	464	270	847.2	8/11/05	284	0.2351	1208	7.8

PIT TAG	FEMALE PIT	MALE PIT	YEAR CLASS	STOCKING DATA				RECAPTURE DATA				GROWTH TRAVEL			
				LENGTH (mm)	STOCK SITE	RIVER MILE	DATE	LENGTH (mm)	WT (g)	RIVER MILE	DATE	GROWTH (mm)	GROWTH (mm/day)	DAYS AT LARGE	TRAVEL (RM)
431A1D2179	220E345E09	1F4A27214F	2001	200	VERDEL, NE	855	4/21/02	395	160	847.2	8/11/05	195	0.1614	1208	7.8
435F155646	411D262C1F	17509415139	2001	290	WOLF POINT	1701.5	7/26/02	328	210	1548.7	8/15/05	38	0.0341	1116	152.8
44440C3955	116224546A	220F107A6F	2002	321	MULLBERRY	775	7/16/03	397	186	635	8/15/05	76	0.0999	761	140
4442645357		MILES CITY	2004	174	KANSAS CITY	342	4/25/05	252	50	289.9	8/18/05	78	0.6783	115	52.1
43217B465F	220E345E09	1F4A111C6A	2001	190	BOONVILLE	195.1	4/11/02	597		210.6	8/22/05	407	0.3312	1229	15.5
432E170E08	411D262C1F	41476A0462	2001	190	MULLBERRY	775	4/3/02	360	150	646	9/8/05	170	0.1356	1254	129
435E640C59	411D262C1F	411D0E2C5F	2001	300	FAIRVIEW	9	7/26/02	452	295	1563.7	9/13/05	152	0.1328	1145	-8.3
44431E1154			2001					380	250	1581	9/21/05				
452E546136			2001					346	148	1630	9/23/05				
44225C5C1A	7F7F054855	115675486A	2003	249	BELLEVUE	601.4	7/8/04	346	102	672.8	9/28/05	97	0.2170	447	71.4
4445725705	114476216A	1F477B3A65	2004	262	SIOUX CITY	732.6	4/22/05	307	78	672.8	9/28/05	45	0.2830	159	59.8
4310261F4E	220E345E09	1F4A111C6A	2001	210	BOONVILLE	195.1	4/11/02	592	655	197.9	9/30/05	382	0.3013	1268	2.8
4444175236	454910202B	1F47606357	2004	209	SIOUX CITY	732.6	4/22/05	309	349	801	11/1/05	100	0.5181	193	68.4
431A2C0953	7F7F06672B	115631222A	2001	210	VERDEL, NE	855	4/21/02	490	415	855	11/7/05	280	0.2160	1296	0
4444211000	116224546A	7F7D461025	2002	291	BELLEVUE	601.4	7/16/03	426	244	642.5	11/7/05	135	0.1598	845	41.1
44230E704B	116224546A	116167123A	2002	355	MULLBERRY	775	7/16/03	413	200	643	11/7/05	58	0.0686	845	132
4445652D60	116224546A	7F7D461025	2002	309	BELLEVUE	601.4	7/16/03	401	190	608.4	11/9/05	92	0.1086	847	7
444327435F	116224546A	1F477B3A65	2002	325	MULLBERRY	775	10/6/03	439	254	653.8	11/9/05	114	0.1490	765	121.2
4324295269	7F7F06672B	7F7D3C5708	2001	200	BOONVILLE	195.1	4/11/02	535	519	202.3	11/21/05	335	0.2538	1320	7.2
44443F245C	116224546A	7F7D461025	2002	319	MULLBERRY	775	7/16/03	396	206	400.2	1/11/06	77	0.0846	910	374.8
AVERAGES				248				357				123	0.3104	607	61

Appendix 3. Proposed Spawn Strategy based on Genetic Distances (after June 9th Miles City spawn)

Female	Male	Male Location	Rogers	Nei	Pairwise Relatedness (Rxy)
Garrison Dam NFH Female					
7F7B026102	115633183A	MC	0.4498	0.6198	0.0046
7F7B026102	444334021A	MC	0.5330	0.8640	-0.1606
7F7B026102	115553761A	GAD	0.4333	0.6890	0.0880
7F7B026102	7F7B023253	GAD	-	-	-
Miles City SFH Females					
4443240458	115633183A	MC	0.4404	0.4955	0.2390 (half sibling)
4443240458	444334021A	MC	0.7357	0.8833	0.0420
44635F477B	7F7B031F17	GAP	0.5352	0.7561	-0.0322
44635F477B	115553761A	GAD	0.5847	0.8047	-0.1184
Gavins Point NFH Females					
115676635A	1F50072169	GAP	0.5007	0.7419	-0.1136
	7F7D2D723D	GAP	0.4577	0.5412	0.1059
	7F7B031F17	GAP	0.4627	0.4722	0.2292 (half sibling)
115557165A	1F50072169	GAP	0.5380	0.7164	0.0516
	7F7D2D723D	GAP	0.5380	0.8938	-0.1597
	7F7B031F17	GAP	0.5890	0.8833	-0.1100
Upper Missouri River Female					
132213574A	7F7B023253	GAD	-	-	-
132213574A	1F482F3F2B	GAD	-	-	-

Appendix 4. Production Temperatures



Appendix 5. Milt Repository

Pit Tag	Year	Source	Straw Size (ml)	~ #	Dewar #	Cane Location #	Motility (fresh)	Motility (pre freeze)	Motility (post freeze)	Represented by progeny in RPA	Straws at Warm Springs FTC
7F7F054773	2000	GAD	0.5	4	1	4	90%				5
2202236E31	2000	CMR	0.5	4	1	4	95%	5%			5
115712453A	2000	GAD	0.5	4	1	4	85%				5
1F4A004552	2000	GAD	0.5	4	1	4	90%				5
1F4A33194B	2000	GAD	0.5	4	1	4	95%				5
1F4A143350	2000	GAD	0.5	5	1	4	90%				5
1F4A27214F	2001	MC	0.5	25	1	1				2,3,4	14
	2001	MC	5	3	1	2				2,3,4	
1F4A111C6A	2001	MC	0.5	20	1	1				2,3,4	14
	2001	MC	5	4	1	2				2,3,4	
115631222A	2001	MC	0.5	20	1	1				3,4	13
	2001	MC	5	3	1	2				3,4	
7F7D3C5708	2001	MC	0.5	20	1	1				3,4	14
	2001	MC	5	4	1	2				3,4	
411D0B4E09 (2265)	2001	CMR	5	1	1	4				1,2	
	2001	CMR	0.5	10	1	4				1,2	
17509415139	2001	CMR	0.5	10	1	4				1,2,3,4	5
41476A0462	2001	CMR	0.5	20	1	4				1,2,3,4	20
	2001	CMR	5	1	1	4				1,2,3,4	
411D0E2C5F	2001	CMR	0.5	20	1	4				1,2,3,4	20
	2001	CMR	5	1	1	4				1,2,3,4	
1F4A4B5973	2001	CMR	0.5	5	1	4				1,2,3,4	
7F7D434B54	2002	GAD	0.5	40	1	5	40%			brood	30
1F477B3A65	2002	GAD	0.5	10	1	5	90%			2,3,4	30
	2002	GAD	0.5	70	1	7	90%			2,3,4	
7F7D461025	2002	CMR	0.5	40	1	6				brood	30
7F7F065834	2002	GAD	0.5	40	1	6					30
115556461A	2002	GAD	0.5	40	1	7					30
1F4772396F	2002	GAD	0.5	40	1	8	35%				30
220F107A6F	2002	GAD	0.5	40	1	8	85%			2,3,4	30

Pit Tag	Year	Source	Straw Size (ml)	~ #	Dewar #	Cane Location #	Motility (fresh)	Motility (pre freeze)	Motility (post freeze)	Represented by progeny in RPA	Straws at Warm Springs FTC
116167123A	2002	GAD	0.5	40	1	9	75%			2,3,4	30
1F4A3E1445	2002	GAD	0.5	40	1	9	80%				30
115544332A	2002	GAD	0.5	40	1	10	90%				30
452738076E	2003	CMR	0.5	130	2	1	90%		5%		
	2003	CMR	5	6	2	3	90%				
411D0E2C5F	2003	CMR	0.5	100	2	5	90%		5+%		
	2003	CMR	5	5	2	5	90%				
452A4E1F15	2003	CMR	5	5	2	4					
	2003	CMR	0.5	80	2	10	60%	30%	<1%		
	2003	CMR	0.5	100	2	6		80%	40%		
	2003	CMR	0.5	100	2	2			5%		
132157621A	2003	GAD	0.5	70	2	4	95%		1-5%	1,2,3,4	
7F7D372A6B	2003	GAD	0.5	50	2	8	70%	30-80%	20%		99
132313521A	2003	GAD	0.5	70	2	8	70%	1-25%	5%	4	100
1F521B1E56	2003	GAD	0.5	80	2	6	80%	0-80%	1 - 5%	3,4	100
	2003	GAD	0.5	70	2	1			<1%	3,4	
1F4A13592B	2003	GAD	0.5	70	2	9	85%	50-85%	35%		100
7F7D291A07	2003	GAD	0.5	80	2	7	80%	1-20%	20%	3,4	100
1F4A363031	2003	GAD	0.5	80	2	7	50%	0-5%	50%	1,4	100
115675486A	2003	GAD	0.5	70	2	10	60%	30-70%	50%	1,2,3,4	100
1F47760123	2003	MC	0.5	70	2	3	65%	65%	1-2%	1,3,4	
115669540A	2003	MC	0.5	60	2	2	50%	55%	<1- 2%	1,2,3,4	
132114552A	2003	MC	0.5	80	2	9	40%	40%	1%	2,3,4	
220E5F4928	2004	GAD	0.5	100	1	9	80%				30%
1F4A312640	2004	GAD	0.5	100	1	8	85%			1,4	30
431565767B	2004	GAD	0.5	99	1	7	95%			2,4	30
430E452777	2004	GAD	0.5	100	1	7	95%			2,4	30
7F7E55466D	2004	GAD	0.5	100	1	5	90%			4	
1F4A4B5973	2004	CMR	0.5	100	1	3	90%			1,2,3,4	30
7F7D487531	2004	CMR	0.5	100	1	3				4	30

Pit Tag	Year	Source	Straw Size (ml)	~ #	Dewar #	Cane Location #	Motility (fresh)	Motility (pre freeze)	Motility (post freeze)	Represented by progeny in RPA	Straws at Warm Springs FTC
7F7E42795C	2004	CMR	0.5	100	1	5	95%				30
220F0E6207	2004	MC	0.5	100	2	5					30
7F7E55466D	2004	GAD	0.5	100	1	5*	90%			4	30
430E452777	2004	GAD	0.5	100	1	7*	95%			2,4	
7F7E42795C	2004	CMR	0.5	55	1	5*	95%				
220F0F7677	2004	GAD	0.5	100	1	10	90%			2,4	30
1F4A3E1445	2004	GAD	0.5	100	1	10	95%			1,4	30
115552116A	2004	GAD	0.5	50	1	8	90%			4	
115552116A	2004	GAD	0.5	50	1	9	90%			4	30
115529097A	2004	GAD	0.5	50	1	6	90%				20
115529097A	2004	GAD	0.5	50	1	3	90%				
7F7F066A40	2004	GAD	0.5	100	2	3	85%				30
1F47606357	2004	GAD	0.5	100	2	1	80%			2,4	30
1F477B4E51	2004	GAD	0.5	100	2	8	40%				30
220F0E6207	2004	MC	0.5	100	2	6*	45%				30
7F7F065834	2004	GAD	0.5	100	2	7	85%			2,4	30
7F7D437250	2004	MC	0.5	100	2	9	95%			2,4	30
115679374A	2004	GAD	0.5	70	2	2	95%			2,4	30
114473737A	2004	GAD	0.5	70	2	3	85%				30
7F7D376F73	2004	GAD	0.5	70	2	10	85%			4	30
1F482F3F2B	2005	GAD	0.5	30			90%	90%			70
7F7B023253	2005	GAD	0.5	30			75%	80%		2	70
115553761A	2005	GAD	0.5	30			75%	75%		2	70
7F7B031F17	2005	GAP	0.5	30			60%	40%		2	70
Total Straws (including 5 ml)				4372							

Dewar Capacity: 2000 ½ ml straws (10 straws/cane - 20 canes/canister - 10 canisters/dewar)
Sixty-two males are represented in the repository as of 2005. Twenty-seven are not represented through progeny in the Missouri River.

List of Tables