I. Project Title: J. W. Mumma Native Aquatic Species Restoration Facility Operation and Maintenance - Colorado

II. Principal Investigator:

Mr. Ted Smith
Colorado Parks and Wildlife
6655 County Road 106 South
Alamosa, CO, 81101
719-587-3392
Email: theo.smith@state.co.us

Co-Principal Investigator: Mr. Joe Marrinan
Colorado Parks and Wildlife
6655 County Road 106 South
Alamosa, CO, 81101
719-587-3392
Email: joe.marrinan@state.co.us

III. Project Summary:

The J. W. Mumma Native Aquatic Species Restoration Facility (Mumma) was constructed in 2000 to facilitate the conservation of rare aquatic native species through captive propagation, genetic conservation, scientific research and public education and awareness. Currently there are ten fish species and one amphibian specie housed on the unit. Many are State Threatened, Endangered or Species of Special Concern and one, the Bonytail chub (BYT), is federally listed as endangered and was given full protection under the Endangered Species Act in 1980. The Mumma facility located in Alamosa, Colorado currently provides BYT in numbers and sizes sufficient to meet the annual stocking plan of the Colorado River Recovery Program (CRRP) for BYT in the Upper Basin of the Colorado River.

In the past, federally endangered Colorado Pikeminnow (CPM) were produced at Mumma for stocking of the San Juan, the Gunnison and the Colorado Rivers. However, since 2006 the CRRP Recovery Team has not requested CPM from the Mumma facility. Currently there are no CPM on unit at Mumma.

The Mumma facility received a small number of Humpback chub (HBC) mixed in with Roundtail chub (RTC) in 2007. The fish were separated by specie, PIT tagged and held in 12 ft. diameter outdoor circular tanks. On August 5th, 2011, the remaining 10 HBC were transferred to The Ouray National Fish Hatchery in Utah. Currently there are no HBC on unit at Mumma.

IV. Study Schedule:

Study schedule is ongoing.

V. Relationship to RIPRAP:

General Recovery Program Support Action Plan
IV. Manage genetic integrity and augment or restore populations
IV.C. Operate and maintain facilities.
IV.C.4. Mumma
Green River Action Plan: Yampa and Little Snake Rivers:
IV.A. Yampa River in Dinosaur National Monument
IV.A.1. Augment or restore populations as needed.
IV.A.1.a. Develop State stocking plan for bonytail in the Yampa River
IV.A.1.a. (1) Implement stocking plan.
Colorado River: Mainstem:
IV.A.5. Develop State stocking plan for bonytail in the Colorado River from Palisade to Loma.
IV.A.5.b. Implement bonytail State stocking plan.

VI. Accomplishment of FY 2011 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

In 2010 Mumma stocked 1,017 (9.856") BYT into Butch Craig Pond and 2,813 (10.578") BYT into the Green River at Echo Park for a grand total of 3,830 BYT stocked by Mumma during calendar year 2010.

Back in 2009 Mumma received 7,500 BYT from the same lot of fish testing positive for Largemouth bass virus (LMBV) at the Dexter (NM) National Fish Hatchery in the fall of 2010. These fish were placed in quarantine at Mumma in 2010-11 and therefore Colorado River #1 and #2 stockings were placed on hold for stocking during the 2010 calendar year pending health inspection results. BYT from all lots tested negative for viruses at Mumma on 11/16/09; 3/23/10; 9/7/10; 10/19/10; and 8/29/11. (Appendix A)

In 2011, with quarantine lifted, Mumma stocked 1237 (11.4943")BYT into Butch Craig Pond; 1,462 (11.4943”) BYT into Colorado River#2; 2,707 (9.8349") BYT into Colorado River#2; and 2833 (9.7567") BYT into Green River at Echo Park for a grand total of 8,239 BYT stocked by Mumma during calendar year 2011.

In 2011, Mumma began development of a BYT broodstock population in the event Dexter (NM) National Fish Hatchery becomes positive again for LMBV. Dexter (NM) NFH has tested negative for viruses since November 2, 2010 but by Colorado Parks and Wildlife (CPW) regulations and policies Mumma can consider them negative if they test negative again on or after 11/02/2012. (Appendix B)

In 2009 BYT at Mumma tested positive for Asian Tapeworm (*Bothriocephalus acheilognathi).* Dr. Carolyn Gunn, DVM, Assistant State Fish Pathologist with CPW, prescribed a treatment regime using the anti-Platyhelminthes drug Praziquantel to flush tapeworm from the intestinal tract of BYT. The treatment appears to be effective as tapeworms flushed from BYT intestinal tracts are typically observed in treatment water within 4 hours of initiation of the treatment. Mumma continues this treatment regime prior to all 2010 and 2011 BYT stockings and is observing fewer tapeworms in the treatment tanks and is progressing towards the elimination of Asian tapeworm from Mumma altogether.

Back in 2007 the Mumma facility received a mixture of 209 HBC and RTC fingerlings. The fish were separated by species; PIT tagged and held in 12 ft. diameter outdoor circular tanks. Following incidences of bird predation, suspected cannibalism and known mortality on August 5th, 2011, the remaining 10 HBC were transferred to The Ouray National Fish Hatchery in Utah.

Fish stocked from Mumma as of November 3, 2011

Species	Year Class	Fish No.	Fish/lb.	Date Stocked	Destination
BYT	2008	1,237	2.195/lb.	06/24/11	Butch Craig Ponds
BYT	2008	1,462	2.195/lb.	08/02/11	Colorado River#2
BYT	2009	1,430	3.504/lb.	09/09/11	Colorado River#2
BYT	2009	1,277	3.504/lb.	10/18/11	Colorado River#2
BYT	2009	2,833	3.589/lb.	11/03/11	Green River
		8,239 Total BYT stocked for calendar year 2011			

Species	Year Class	Fish No.	Fish/lb.	Date Transferred	Destination
HBC	2007	10	3.561/lb.	08/05/11	Ouray NFH

Fish remaining on station as of November 3, 2011

Species	Year Class	Fish No.	Fish/lb.	Impoundment
BYT	2009	2,166	3.589/lb.	POND 1
BYT	2010	10,000	134/lb.	POND 2
BYT	2010	10,000	134/lb.	POND 3
BYT	2009	2,210	3.504/lb.	POND 4
BYT	2008	120 Future Broodstock		POND B1
		24,496 Total BYT currently on unit at Mumma		

VII. Recommendations:

1. To continue to refine culture techniques and dietary requirements of BYT at Mumma to meet future stocking requests of BYT into selected Colorado waters.
2. To deliver 5,400 BYT at 200mm average total length by fall, 2012.
3. To continue development of BYT broodstock population at Mumma in the event Dexter National Fish Hatchery becomes positive again for LMBV. (Note: Appendix B is a fish health certification from Dr. Theresa Lewis, USFWS, for

Dexter (NM) NFH. They have tested negative for viruses since November 2, 2010. By CPW regulations and policies here in Colorado we can consider them negative if they again test negative on or after 11/02/2012.)

4. To continue with anti-Platyhelminthes treatments of BYT and to annually inspect for LMBV at Mumma.
5. To continue with the PIT tagging BYT at Mumma prior to all spring and fall stockings.
6. To attempt to culture larger BYT in the 250 to 300 mm range FY2012 to promote and enhance survival of BYT in the resource.
7. To provide in-tank stream flow training and/or conditioning of BYT at Mumma to promote and enhance survival of BYT in the resource.
8. To attempt to match receiving water temperatures with culture water temperatures at time of stocking to promote and enhance survival of BYT in the resource.
9. To investigate predator training of BYT at Mumma to promote and enhance survival of BYT in the resource.

VIII. Project Status:

Project is ongoing.

IX. FY 2011 Budget Status:

A. Funds Provided: $81,900.00
B. Funds Expended: $81,900.00 (see budget detail below)
C. Difference: $0.00
D. Percent of the FY 2011 work completed, and projected costs to complete: 100%
E. Recovery Program funds spent for publication charges: $0.00

Figures below are based on Daily Activity Reports (DARS) Data; the Budget Reporting Analysis Support System (BRASS) Data; Financial Data Warehouse Data; the fact 39 percent of total water usage at Mumma NARSF going towards BYT production; and the fact 30 percent of total surface area of production ponds at Mumma NASRF going towards BYT production.

Category	2010	2011	Comments
Feed	$5,040.67	$11,700.00	Current feed levels
Equipment maintenance/repair	$750.00	$3,700.00	Based on BRASS
Travel/Training/Phone	$897.87	$1,250.00	Additional training
Fleet vehicle charges	$509.85	$0.00	See category below
Stocking vehicle use/maintenance	$2,468.16	$2,950.00	Fleet & mileage
Utilities	$17,550.53	$18,300.00	Based on water usage
Building/Grounds	$2,000.00	$2,500.00	Separated
Bicarbonate			
Discharge chlorine	$4,920.00	$5,700.00	Total chemical usage
Sodium Bicarbonate	$1,790.73	$0.00	See category above

Labor	$45,275.25	$35,800.00	Based on BYT DARS
Totals	$81,203.06	$81,900.00	

X. Status of Data Submission (Where applicable): N/A

XI. Signed: *Ted Smith* November 7, 2011
Principal Investigator Date

XII. Appendices:

APPENDIX A - J. W. Mumma Native Aquatic Species Restoration Facility Fish Health Inspection Certificate

APPENDIX B - Dexter (NM) National Fish Hatchery Fish Health Inspection Certificate

APPENDIX A

J. W. Mumma Native Aquatic Species Restoration Facility
Fish Health Inspection Certificate

COLORADO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WILDLIFE
AQUATIC RESOURCES SECTION - AQUATIC ANIMAL HEALTH LAB

CDOW Case No. 11-145
USFWS Case No. 11-281

FISH HEALTH INSPECTION CERTIFICATE

This report is NOT evidence of future disease status. To determine current status, contact inspecting biologist below.

Name of Fish Source: NASRF
Water Code:
Address or Location: 6655 S. CO Rd 106, Alamosa CO 81101

Name of Owner or Manager: Ted Smith 719-587-3392

Inspection Dates:	Classification:
This 8/29/11	Negative for Viruses
Prior 10/19/10	Negative for Viruses
9/7/10	Negative for Viruses
3/23/10	Negative for Viruses
11/16/09	Negative for Viruses

FISH EXAMINED					Pathogens Inspected for and Results:						
Lot No.	Species	Age (Mo.)	No. in Lot	Obtained as Eggs (E) or Fish (F) from:	LAB* A BF	LAB* A BR	LAB* A BK	LAB* A WD	LAB* B IPNV	LAB* B VHSV	LAB* B LMBV
1	RCH	2 to 15	60,000	NSF11RCHHC06NSF						60	60
				NSF11RCHHC07NSF, NSF10RCHSL05NSF						-	-
2	RGS	2	13,441	NSF11RGSCC06NSF, NSF11RGSHC06NSF						60	60
				NSF11RGSRT06NSF						-	-
3	ADR	4	3,000	NSF11ADREHC04NSF						60	60
										-	-
4	PMW	1 to 15	20,000	NSF11PMWKS-OK07NSF						60	60
				NSF10PMWKS-OK05NSF						-	-
5	BYT	2 to 27	50,000	NSF09BYT05FSD						60	60
				NSF10BYT05FSD, NSF09RTCMN06NSF						-	-
6	RTC	2	33,000	NSF11RTCLP06NSF						60	60
				NSF11RTCNUXSJ06NSF						-	-
7	NRD	Var	4,000	NSF11NRDNSF						60	60
										-	-

* Insert "A" for AAHL/Brush, "B" for USFWS/Bozeman

Collector: Deanna Freng
Date collected: 8/29/2011
Date received: 8/30/2011

[X] Hatchery [X] Public
[ ] Free-ranging [ ] Private

Type of Water Supply:
[ ] Impoundment [X] Enclosed [ ] Stream
[X] Spring [X] Well [ ] Free of Fish

Inspecting Biologist Date 10/11/11
Vicki K. Milano, Fish Pathologist

Certifying Official Date 10/19/11
Peter G. Walker, Senior Fish Pathologist

REMARKS:

Page of

APPENDIX B

Dexter (NM) National Fish Hatchery
Fish Health Inspection Certificate

DEPARTMENT OF THE INTERIOR
U.S. Fish and Wildlife Service
FISH HEALTH INSPECTION REPORT[1]

This report is NOT evidence of future disease status. To determine status, contact the inspecting biologist below.

Fish Source & Facility Contact	Fish Examined	Water Supply[2]	5 year facility classification
Dexter NFH & TC 7116 Hatchery Road Dexter, NM 88230 (575) 734-5910 Manuel Ulibarri, Center Director	☑ Hatchery ☐ Wild	☐ Unsecured: Open Spring, Stream ☑ Secured: Well, sterilized	1 10/12,19,26/11 sLMBV 2 4/4/11, 11/02/10 sLMBV 3 8/23/10 LMBV 4 8/31/09 A 5 9/22/08, 9/04/07 A, A

Species[3]	Lot Identity	Age[4]	# in lot	Eggs (E) or fish (F) Obtained From	Pathogens inspected[3] & results[5]													
					EI	AS	YR	RS	MC	IH	IP	IS	LM	OM	SV	VH	A	B
WDF	11VRDX	6	15,000	(E) Dexter NFH	60	60	60			150	150		150			150	60	
					-	-	-			-	-		-			-	-	
RBS	06LMDX	54-66	700	(E) Dexter NFH	60	60	60			150	150		150			150	60	
					-	-	-			-	-		-			-	-	
BTC	07LMDX	53	5,000	(E) Dexter NFH	60	60	60			150	150		150			150	60	
					-	-	-			-	-		-			-	-	
RGSM	11CSDX	4	400,000	(E) Dexter NFH	60	60	60			150	150		150			150	60	
					-	-	-			-	-		-			-	-	
BBG	Mixed	varies	1,000	(E) Dexter NFH	60	60	60			60	60		60			60	60	
					-	-	-			-	-		-			-	-	
CSP	Mixed	varies	1,000	(E) Dexter NFH	60	60	60			60	60		60			60	60	
					-	-	-			-	-		-			-	-	
RBS	08/09LMDX	30-42	7,000	(E) Dexter NFH	60	60	60			150	150		150			150	60	
					-	-	-			-	-		-			-	-	
RBS	11LMDX	6	50,000	(E) Dexter NFH	60	60	60			150	150		150			150	60	
					-	-	-			-	-		-			-	-	
BTC	09LMDX	29	26,000	(E) Dexter NFH	60	60	60			150	150		150			150	60	
					-	-	-			-	-		-			-	-	

Remarks[6]: A= Asian Tapeworm

Inspecting Biologist Signature	Concurred (signature & title)	
Print: Stacy Cooper Date: 11/02/2011	Print: Teresa Lewis, Ph.D. Date: 11/02/2011	Dexter Fish Health Center 7115 Hatchery Road Dexter, NM 88230 (575) 734-5910

[1] Done in accordance with the AFS Fish Health Section Bluebook *Suggested Procedures for the Detection and Identification of Certain Finfish and Shellfish Pathogens* and the U.S. Fish and Wildlife Service Fish Health Policy 713 FW 1-5. [2] Secure = free of all aquatic pathogens or sterilized, Unsecured = aquatic pathogens may be present. [3] FWS abbreviations (see back of this page), [4] For hatchery fish give age in months; for feral fish, use symbols: e=eggs or fry; f=fingerling; y=yearlings; b=older fish. [5] Findings reported as number examined over results; (-) = undetected, (+) = positive, and NT= not tested, A,B = other pathogens as listed in remarks[5] Additional remarks can be made on back page.

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U.S. Fish and Wildlife Service
FISH HEALTH INSPECTION REPORT[1]

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Fish Source & Facility Contact	Fish Examined	Water Supply[2]	5 year facility classification
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Species[3]	Lot Identity	Age[4]	# in lot	Eggs (E) or fish (F) Obtained From	Pathogens inspected[3] & results'[5]													
					EI	AS	YR	RS	MC	IH	IP	IS	LM	OM	SV	VH	A	B
DEP	Mixed	varies	1,000	(E) Dexter NFH	60	60	60			60	60		60			60	60	
					-	-	-			-	-		-			-	-	
GBS	Mixed	varies	1,000	(E) Dexter NFH	60	60	60			60	60		60			60	60	
					-	-	-			-	-		-			-	+	
CCF	10TISH	16	4,500	(F) Tishomingo NFH	60	60	60			150	150		150			150	60	
					-	-	-			-	-		-			-	-	
BTC	11LMDX	5	20,000	(E) Dexter NFH	60	60	60			150	150		150			150	60	
					-	-	-			-	-		-			-	-	
CPM	11CRDX	4	500,000	(E) Dexter NFH	60	60	60			150	150		150			150	60	
					-	-	-			-	-		-			-	-	
LSP	Mixed	varies	1,000	(E) Dexter NFH	60	60	60			60	60		60			60	60	
					-	-	-			-	-		-			-	-	
*HBC	99WCLCR	144	34	(F) wild caught						10	10		10			10		5/5
										-	-		-			-		
*BTC	PMBS/LMDX	varies	800	(E) Dexter NFH						30	30		30			30		15/15
										-	-		-			-		
*BTC	11LMDX	<1	30,000	(E) Dexter NFH						60	60		60			60		
										-	-		-			-		

Remarks[6]: *indicates samples submitted/tested during spawning season; A=Asian Tapeworm, B= number of OF/SF submitted

Inspecting Biologist Signature	Concurred (signature & title)	
Stacy Cooper Print: Stacy Cooper Date: 11/02/2011	Teresa Lewis Print: Teresa Lewis, Ph. D. Date: 11/02/2011	Dexter Fish Health Center 7115 Hatchery Road Dexter, NM 88230 (575) 734-5910

[1] Done in accordance with the AFS Fish Health Section Bluebook *Suggested Procedures for the Detection and Identification of Certain Finfish and Shellfish Pathogens* and the U.S. Fish and Wildlife Service Fish Health Policy 713 FW 1-5. [2] Secure = free of all aquatic pathogens or sterilized, Unsecured = aquatic pathogens may be present. [3] FWS abbreviations (see back of this page), [4] For hatchery fish give age in months; for feral fish, use symbols: e=eggs or fry; f=fingerling; y=yearlings; b=older fish. [5] Findings reported as number examined over results; (-) = undetected, (+) = positive, and NT= not tested, A,B = other pathogens as listed in remarks[6] Additional remarks can be made on back page.

DEPARTMENT OF THE INTERIOR
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FISH HEALTH INSPECTION REPORT[1]

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Fish Source & Facility Contact	Fish Examined	Water Supply[2]	5 year facility classification
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Species[3]	Lot Identity	Age[4]	# in lot	Eggs (E) or fish (F) Obtained From	Pathogens inspected[3] & results[5]													
					EI	AS	YR	RS	MC	IH	IP	IS	LM	OM	SV	VH	A	B
*CPM	94/02CRDX	varies	329	(E) Dexter NFH						40	40		40			40		20/20
										-	-		-			-		
*RBS	WCLM	varies	342	(F) wild caught						33	33		33			33		18/15
										-	-		-			-		
*RBS	11LMDX	<1	50,000	(E) Dexter NFH						60	60		60			60		
										-	-		-			-		

Remarks[6]: *indicates samples submitted/tested during spawning season; B= number of OF/SF submitted

Inspecting Biologist Signature	Concurred (signature & title)	
Stacy Cooper Print: Stacy Cooper Date: 11/02/2011	Teresa Lewis Print: Teresa Lewis, Ph. D. Date: 11/02/2011	Dexter Fish Health Center 7116 Hatchery Road Dexter, NM 88230 (575) 734-5910

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DEPARTMENT OF THE INTERIOR
U.S. Fish and Wildlife Service
FISH HEALTH INSPECTION REPORT[1]
This report is NOT evidence of future disease status. To determine status, contact the inspecting biologist below.

Additional Inspection Information
Laboratory Case Number:
11-101

150 fish were sampled for virology testing (98% CI) for production lots. 60 fish (95% CI) were sampled for virology testing for refuge lots. Enhanced testing was done to accommodate partner requests relating to LMBV suspect status of facility.

Virology tissue samples tested included a kidney/spleen pooled sample and a separate liver/swim bladder/gill pooled sample (5 fish pools) unless whole viscera was tested. For whole viscera samples, swim bladder was dissected out and included in gill sample pool with liver remaining part of the whole viscera pool. Virology testing was done using EPC and FHM cell lines with routine interim blind pass of all samples. LMBV diagnostic test on FHM cells was set up in duplicate test plates and incubated at 25 and 30 C.

Bacteriology and parasitology testing was done using standard 60 fish for all lots. All lots tested for bacterial pathogens were also negative for Edwardsiella tarda. Microscopic examination of GBS lot positive for Asian tapeworm indicated low prevalence of tapeworm - GI tracts from 42 fish were screened before this parasite was detected.

Spawning samples (OF/SF and fry as indicated in report) were all negative for LMBV and other viruses as indicated. Reference case numbers 11-40 (RBS), 11-54 (HBC), 11-60 (BTC), 11-73 (CPM) for OF/SF testing, 11-46 (RBS), 11-64 (BTC) for fry. WDF were sampled on 8/29/11 to meet Utah export permit processing time requirements, case number 11-99.

PATHOGEN ABBREVIATIONS
AS Aeromonas salmonicida
EI Edwardsiella ictaluri
RS Renibacterium salmoninarum
YR Yersinia rucken
MC Myxobolus cerebralis
IH Infectious Hematopoietic Necrosis Virus
IP Infectious Pancreatic Necrosis Virus
IS Infectious Salmon Anemia Virus
LM Largemouth Bass Virus
OM Oncorhynchus masou Virus
SV Spring Viremia of Carp Virus
VH Viral Hemorrhagic Septicemia Virus

SPECIES ABBREVIATIONS			
Amur Pike AMP	Colorado Pikeminnow CPM	Kokanee KUE	Rainbox Trout X Steelhead
Apache Trout APT	Comanche Springs pupfish CSP	Landlocked ATS LAS	RBTSTT
Arctic Grayling ARG	Cutthroat Trout CUT	Leon Springs pupfish LSP	Razorback Sucker RBS
Atlantic Salmon ATS	Darters DAR	Lake Trout LAT	Redear Sunfish RSF
Beautiful Shiner GBS	Desert Pupfish DEP	Lampreys LAY	Rio Grande Silvery Minnow RGSM
Big Bend Gambusia BBG	Desert Sucker DES	Largemouth Bass LMB	Sanora Sucker SOS
Bigmouth Buffalo BIB	Devils Hole Pupfish DHP	Livebearers LIR	Sauger SAR
Black Bullhead BLB	Dolly Varden DOV	Miscellaneous Warm Water MSC	Smallmouth Buffalo SAB
Black Crappie BLC	Dolly Varden X BKT DOVBKT	Mooneyes MOE	Silver Carp SVC
Blue Catfish BCF	Fall Chinook Salmon FCS	Mudminnows MUW	Smallmouth Bass SMB
Blue X Channel BCFCCF	Fathead Minnow FHM	Muskellunge MUE	Sockeye Salmon SOS
Bluegill BLG	Flathead Catfish FCF	Northern Pike NOP	Spotted Bass SPB
Blue Pike BLP	Freshwater Drums FRD	Ohrid Trout OHT	Spring Chinook Salmon SCS
Bluntnose Shiner PBS	Gars GAR	Other Catfishes OCF	Steelhead Trout STT
Bonytail Chub BTC	Gila Topminnow GTM	Other Minnows OTM	Sticklebacks STK
Bowfin BON	Gila Trout GIT	Other Pikes OTP	Striped Bass STB
Brook Trout BKT	Golden Shiner GOS	Other Salmonids OSA	Sturgeons STN
Brown Bullhead BRB	Golden Trout GOT	Other Suckers OTS	Virgin Chub VRC
Brown Trout BNT	Goldfish GOF	Other Sunfishes OSF	Walleye WAE
Carp CAP	Grass Carp GRC	Paddlefish PAH	Walleye X Sauger WAESAR
Channel Catfish CCF	Green Sunfish GSF	Pahranagat Roundtail Chub PRC	Warmouth WAM
Chihuahua Chub CCH	Guadalupe Bass GUB	Pecos Gambusia PEG	White Catfish WCF
Chum Salmon CHS	Herrings HEG	Pink Salmon PKS	Winter Chinook Salmon WCS
Coho Salmon COS	Killifishes KIH	Rainbow Trout RBT	Woundfin WDF