

## ARRA Invasive Mussel Detection Project

### *Reclamation Reporting Protocols*

#### Background

Recognizing the sensitivity associated with positive detection of mussels in newly monitored water bodies, clear and consistent procedures are required for reporting results from the Mussel Detection Project. This document serves to communicate Reclamation's reporting procedures to Reclamation management, State Aquatic Nuisance Species (ANS) Coordinators, and field and laboratory personnel involved in all phases of this project. Although positive detections are of great interest, there is also value in the reporting of negative results. Therefore, regardless of the results, the same reporting procedures will be used. For further information on this project please contact:

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ARRA Detection Project Manager  
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The reporting protocols described herein were formulated with consideration for individual States' reporting requirements and the accepted practices and definitions published by the 100<sup>th</sup> Meridian Initiative (<http://100thmeridian.org/>), *Interagency Dreissena Monitoring Plan for Western Waters, A 100th Meridian Partnership Plan* (2009). The relevant definitions are:

**ACTIVELY MONITORED** – Waters identified in management plans to be regularly sampled (more than once/year) for veligers and settled adults on substrates. Data (date, location, method, etc.) are collected, processed and recorded by agency or qualified persons for local or regional management decisions.

**INTERMITTENTLY MONITORED** – Waters sampled for veligers and adults by agency or qualified persons once each year or less often. Data is collected, processed and recorded by agency or qualified persons for regional management decisions.

**UNKNOWN** – Waters which have not been tested

**NEGATIVE** – Monitored waters with no evidence of mussels.

**SUSPECT** – Monitored waters which have initial but unconfirmed evidence of mussel presence.

**POSITIVE** – Monitored waters where mussel presence has been confirmed by

- Two independent microscopic detections of veligers from one plankton sample, or
- Two distinct PCR assays from one sample, or
- One microscopy detection plus one PCR confirmation from a single sample, or
- Detections from different samples by either method, or
- Adult mussels found on sample substrates.

## Results Designation & Reporting Procedures

All water bodies to be monitored under the ARRA Detection Project are initially considered **UNKNOWN** and will be **ACTIVELY MONITORED** consistent with the above definitions. A list of water bodies targeted for monitoring is given as Table 1 and includes the Reclamation Region, Area Office, and State where the target water body is located.

From the 100<sup>th</sup> Meridian Initiative protocol, there is some flexibility as to how a **POSITIVE** detection may be defined, and various states have adopted different options. Nevertheless, Reclamation's ARRA Detection Project defines a **POSITIVE** detection as microscopic detection followed by PCR confirmation or independent microscopy confirmation for a specific sample. This is consistent with the 100<sup>th</sup> Meridian Initiative recommendations.

Water sampling for microscopic analysis will include vertical and/or oblique plankton tows and microscopic examination consistent with the 100<sup>th</sup> Meridian Interagency *Dreissena* Monitoring Plan for Western Waters. Water samples will be collected<sup>1</sup> and sent to the Project Manager for laboratory analysis:

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Reclamation Regional Mussel Task Force representatives and Area Managers with responsibility for the tested water body will be provided, by the Project Manager, all results using a standard reporting template (Appendix A). For all results of testing (i.e., POSITIVE, SUSPECT, and NEGATIVE), the same reporting procedures will be used to inform Reclamation managers.

Where POSITIVE results are reported, the Reclamation managers will be informed of State reporting requirements and advised to notify the respective State ANS Coordinator consistent with the State's reporting requirements (with a copy of the notification sent to the Mussel Detection Project Manager). If a copy of the notification is not received by the Project Manager within the time frame established under State reporting requirements, then the Project Manager and the Director, Research and Development, are obligated to immediately report the findings to the State. Contact information for each State ANS Coordinator is provided in Table 2. It will be the responsibility of Reclamation's Regional and Area Offices to coordinate any public release of results with the appropriate State agencies.

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<sup>1</sup> Collection requires use of 63- or 64-micron mesh plankton tow net that can capture mussel larvae. The recommended total field-collected volume is 1,000L. However, there are Reclamation reservoirs with high algal density for which it will be difficult to process 1,000L samples. When water conditions do not permit collection of clear samples, collection volumes will be reduced to enhance detection. When water conditions permit, the total volume may be collected with several tows and composited. When compositing occurs, GPS points and samples should be collected from the same general area of the reservoir, so that in the event of a positive, the location of presence can be identified. Following collection, the sample volume will be reduced to 1L or less by allowing the water to drain through the mesh. The final volume is then put into a sample bottle, preserved with ethanol, and labeled. This process is described in the sampling protocol which has been provided by the Project Manager

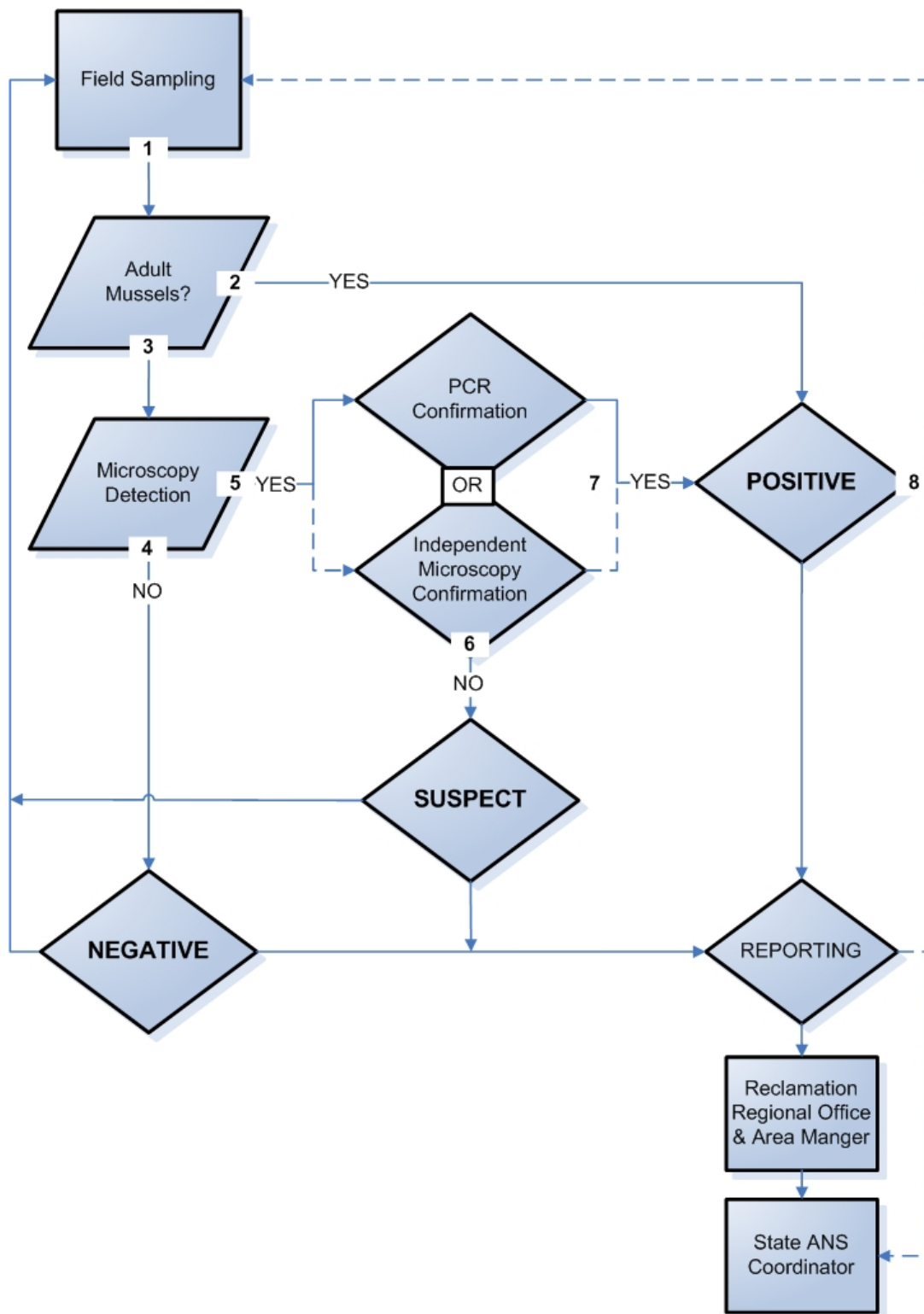
## Decision Process

A flow diagram for testing samples and reporting results is provided as Figure 1. The process is described as follows:

1. All field sampling personnel will be required to look for evidence of adult mussels during field visits to monitoring sites. If substrate sampling is in place, then samplers will be visually inspected and returned to service. Any evidence of adult mussels found on samplers, boats, boat docks, buoys, equipment, or otherwise shall be documented, photographed, collected, preserved in 75% alcohol, and shipped for identification to

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Denver, Colorado 80225-0007  
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2. The presence of adult mussels constitutes a **POSITIVE** designation under the 100<sup>th</sup> Meridian Initiative definitions. Findings related to adult mussels will be reported consistent with reporting of all results as described above.
3. Regardless of whether adults are found or not, plankton tow samples will be collected and sent to the Project Manager for laboratory analysis to assess the extent of infestation.
4. Laboratory analysis will first require microscopic analysis (microscopy). If evidence of mussels is not found through microscopy, the results will be designated **NEGATIVE** and sampling at the subject water body will continue at the next regularly scheduled field sampling date. **NEGATIVE** results will be reported consistent with the procedures described for all results.
5. If larval mussels (*i.e.*, veligers) are found in a sample, photographic evidence will be acquired for documentation. The samples from which microscopy detections have been made will then be analyzed through PCR or independent microscopy for confirmation. PCR is recommended, but independent microscopy may be chosen in cases where conditions preclude sound PCR analysis. This decision is the responsibility of the Project Manager.
6. If confirmation by PCR or independent microscopy is not obtained, then the subject water body will be designated **SUSPECT** and results will be reported consistent with the procedures described for all results.
7. If confirmation for the detection sample is found by PCR or independent microscopy, the subject water body will be designated **POSITIVE** and the results will be reported consistent with the procedures described for all results.
8. In cases where **POSITIVE** results are obtained, it is recommended that monitoring continue, but the decision to discontinue in favor of shifting resources for monitoring elsewhere will be at the discretion of the Project Manager and Director, Research and Development.



**Figure 1.** - Decision process diagram for detection and reporting of results. Dashed lines represent optional decisions by the Project Manager and/or Director, Research and Development.

**Table 1. Monitoring Locations, Regions, Area Offices, and States (Latest as of 6/30/2009 – Subject to revision)**

<b>Reservoir</b>	<b>Region</b>	<b>Area Office</b>	<b>State</b>	<b>Area Office Contact</b>
Angostura Reservoir	GP	Dakotas Area Office	SD	Cindy Larom (605) 394-9757
Belle Fourche Reservoir		Dakotas Area Office	SD	Cindy Larom (605) 394-9757
Pactola Reservoir		Dakotas Area Office	SD	Cindy Larom (605) 394-9757
Keyhole Reservoir		Dakotas Area Office	WY	Cindy Larom (605) 394-9757
Shadehill Reservoir		Dakotas Area Office	SD	Cindy Larom (605) 394-9757
Flat Iron Reservoir		Eastern Colorado Area Office	CO	Carlile Ronca (970) 962-4350
Pole Hill Afterbay		Eastern Colorado Area Office	CO	Carlile Ronca (970) 962-4350
Mary's Lake		Eastern Colorado Area Office	CO	Carlile Ronca (970) 962-4350
Pinewood Reservoir		Eastern Colorado Area Office	CO	Carlile Ronca (970) 962-4350
East Portal		Eastern Colorado Area Office	CO	Carlile Ronca (970) 962-4350
Canyon Ferry Reservoir		Montana Area Office	MT	Pete Stevenson (406) 247-7310
Yellowtail Reservoir (Bighorn Lake)		Montana Area Office	MT	Pete Stevenson (406) 247-7310
Clark Canyon Reservoir		Montana Area Office	MT	Pete Stevenson (406) 247-7310
Tiber Reservoir		Montana Area Office	MT	Pete Stevenson (406) 247-7310
Fresno Reservoir		Montana Area Office	MT	Pete Stevenson (406) 247-7310
Helena Valley Reservoir		Montana Area Office	MT	Pete Stevenson (406) 247-7310
Nelson Reservoir		Montana Area Office	MT	Pete Stevenson (406) 247-7310
Enders Reservoir		Nebraska-Kansas Area Office	NE	Mike Delvaux (308) 389-5314
Swanson Reservoir		Nebraska-Kansas Area Office	NE	Mike Delvaux (308) 389-5314
Red Willow Dam (Hugh Butler Lake)		Nebraska-Kansas Area Office	NE	Mike Delvaux (308) 389-5314
Medicine Creek Dam (Henry Strunk Lake)		Nebraska-Kansas Area Office	NE	Mike Delvaux (308) 389-5314
Calamus Reservoir		Nebraska-Kansas Area Office	NE	Mike Delvaux (308) 389-5314
Lovwell Reservoir		Nebraska-Kansas Area Office	KS	Mike Delvaux (308) 389-5314
Cedar Bluff Reservoir		Nebraska-Kansas Area Office	KS	Mike Delvaux (308) 389-5314
Glen Elder Dam (Waconda Lake)		Nebraska-Kansas Area Office	KS	Mike Delvaux (308) 389-5314
McGee Creek Reservoir		Oklahoma-Texas Area Office	OK	Charlie Webster (405) 470-4831
Thunderbird Reservoir		Oklahoma-Texas Area Office	OK	Charlie Webster (405) 470-4831
Fort Cobb Reservoir		Oklahoma-Texas Area Office	OK	Charlie Webster (405) 470-4831
Foss Reservoir		Oklahoma-Texas Area Office	OK	Charlie Webster (405) 470-4831
Glendo Reservoir		Wyoming Area Office	WY	Mahonri Williams (307) 261-5624
Boysen Reservoir		Wyoming Area Office	WY	Mahonri Williams (307) 261-5624
Buffalo Bill Reservoir		Wyoming Area Office	WY	Mahonri Williams (307) 261-5624
Roosevelt Lake (Roosevelt Dam on Salt River)	LC	Salt River Project	AZ	Lesly Swanson (602) 236-2893
Saguaro Lake (Stewart Mountain Dam on Salt River)		Salt River Project	AZ	Lesly Swanson (602) 236-2893

Canyon Lake (Mormon Flat Dam on Salt River)		Salt River Project	AZ	Lesly Swanson (602) 236-2893
Bartlett Lake (Bartlett Dam on Verde River)		Salt River Project	AZ	Lesly Swanson (602) 236-2893
Apache Lake (Horse Mesa Dam on Salt River)		Salt River Project	AZ	Lesly Swanson (602) 236-2893
Granite Reef Dam (beginning of our canal system where CAP, Verde River and Salt River water meet)		Salt River Project	AZ	Lesly Swanson (602) 236-2893
Lahontan Reservoir	MP	LBAO	NV	Andrea Minor (775) 884-8366
Stampede Reservoir		LBAO	CA	Andrea Minor (775) 884-8366
Lake Berryessa		CCAO	CA	David Robinson (916) 989-7179
New Melones		CCAO	CA	David Robinson (916) 989-7179
Folsom Lake		CCAO	CA	David Robinson (916) 989-7179
Keswick Reservoir		NCAO	CA	Basia Trout (530) 528-0512
Stony Gorge Reservoir		NCAO	CA	Basia Trout (530) 528-0512
Shasta Reservoir		NCAO	CA	Basia Trout (530) 528-0512
Whiskeytown Lake		NCAO	CA	Basia Trout (530) 528-0512
Trinity Lake		NCAO	CA	Basia Trout (530) 528-0512
Tracy Fish Collection Facility		SCAO (Tracy)	CA	Carl Dealy (209) 836-6236
Casitas Reservoir		SCAO (Fresno)	CA	Jackie Collins (559) 487-5409
Millerton Lake		SCAO (Fresno)	CA	Jackie Collins (559) 487-5409
Cachuma Lake		SCAO (Fresno)	CA	Jackie Collins (559) 487-5409
Link River Diversion Dam (Upper Klamath Lake)		KBAO	OR	Cindy Williams (541) 880-2585
Note: PN will perform all sampling for these lakes and send samples to the TSC for veliger analyses	PN			Clyde Lay, (208) 685-6926 is Regional Office contact
Henry Hagg Lake		Columbia Cascades Area Office	OR	Kathleen Cushman (541) 389-6541
Emigrant Reservoir		Columbia Cascades Area Office	OR	Kathleen Cushman (541) 389-6541
Prineville Reservoir		Columbia Cascades Area Office	OR	Kathleen Cushman (541) 389-6541
Cle Elum Reservoir		Columbia Cascades Area Office	WA	Bruce Loranger (509) 754-0210
Lake Roosevelt		Columbia Cascades Area Office	WA	Bruce Loranger (509) 754-0210
Banks Lake		Columbia Cascades Area Office	WA	Bruce Loranger (509) 754-0210
Hungry Horse Reservoir		Grand Coulee Power Office	MT	Bruce Loranger (509) 754-0210
Jackson Lake		Snake River Area Office	WY	Ryan Newman (208) 678-0461 X-38

Palisades Reservoir		Snake River Area Office	ID	Ryan Newman (208) 678-0461 X-38
Island Park Reservoir		Snake River Area Office	ID	Ryan Newman (208) 678-0461 X-38
American Falls Reservoir		Snake River Area Office	ID	Ryan Newman (208) 678-0461 X-38
Lake Walcott		Snake River Area Office	ID	Ryan Newman (208) 678-0461 X-38
Anderson Ranch Reservoir		Snake River Area Office	ID	Steve Dunn (208) 383-2222
Cascade Reservoir		Snake River Area Office	ID	Steve Dunn (208) 383-2222
Owyhee Reservoir		Snake River Area Office	OR	Steve Dunn (208) 383-2222
Flaming Gorge Reservoir	UC	Power	UT	Jane Blair, 801-524-3628
Elephant Butte Reservoir		Albuquerque	NM	Nancy Umbreit, 505-462-3599
Navajo Reservoir		Albuquerque	NM	Nancy Umbreit, 505-462-3599
Strawberry Reservoir		Provo	UT	Russ Findlay, 801-379-1084
Pineview Reservoir		Provo	UT	Russ Findlay, 801-379-1084
Deer Creek Reservoir		Provo	UT	Sampled by Central UT Water Cons. Dist.
Ridgway Reservoir		Provo	UT	Russ Findlay, 801-379-1084
Willard Bay Reservoir		Provo	UT	Russ Findlay, 801-379-1084
Jordanelle Reservoir		Provo	UT	Sampled by Central UT Water Cons. Dist.
Wanship Reservoir/Rockport Dam		Provo	UT	Russ Findlay, 801-379-1084
Caballo		Albuquerque	NM	Nancy Umbreit, 505-462-3599
Rifle Gap		Grand Junction	CO	Kathleen Ozga, 970-248-0649
Echo Reservoir		Provo	UT	Russ Findlay, 801-379-1084
Vega Reservoir		Grand Junction	CO	Kathleen Ozga, 970-248-0649
Fontenelle Reservoir		Provo	WY	Russ Findlay, 801-379-1084
El Vado Reservoir		Albuquerque	NM	Nancy Umbreit, 505-462-3599
Heron Lake		Albuquerque	NM	Nancy Umbreit, 505-462-3599
Brantley		Albuquerque	NM	Nancy Umbreit, 505-462-3599
Sumner		Albuquerque	NM	Nancy Umbreit, 505-462-3599
Vallecito Reservoir		Grand Junction	CO	Kathleen Ozga, 970-248-0649
McPhee Reservoir		Grand Junction	CO	Kathleen Ozga, 970-248-0649

**Reclamation Mussel Task Force Contacts:**

Corporate Task Force Coordinator – Darrel Krause, (303) 445-2941, dkrause@usbr.gov

PN Region Coordinator – Scott Lund, (208) 378-5037, slund@usbr.gov

MP Region Coordinator – Kris Walters, (916) 978-5346, kwalters@usbr.gov

GP Region Coordinator – Stefanie Jordan, (406) 247-7744, sjordan@usbr.gov

UC Region Coordinator – Robert Radtke, (801) 524-3719, rradtke@usbr.gov

LC Region Coordinator – Leonard Willett, (702) 494-2216, lwillett@usbr.gov

**Table 2.** State ANS Coordinator Contact Information

State	Regulatory Requirement for Reporting	ANS Coordinator	Phone	Email
Arizona	None	Tom McMahon, AZ Game & Fish Dept	(623) 236-7366	<a href="mailto:Tmcmahon@azgfd.gov">Tmcmahon@azgfd.gov</a>
California	Immediate Sec 2301e	Susan Ellis, CA Dept. of Fish & Game		<a href="mailto:sellis@dfg.ca.gov">sellis@dfg.ca.gov</a>
Colorado	Immediate #806 & 807	Elizabeth Brown, CO Dept. of Wildlife	(303) 291-7362	<a href="mailto:elizabeth.brown@state.co.us">elizabeth.brown@state.co.us</a>
Idaho	?	Amy Ferriter, ID State Dept. Of Wildlife	(208) 332-8686	<a href="mailto:Aferriter@agri.idaho.gov">Aferriter@agri.idaho.gov</a>
Kansas	None	Jason Goeckler, Kansas Wildlife and Parks	(620) 342-6248	<a href="mailto:Jasong@wp.state.ks.us">Jasong@wp.state.ks.us</a>
Montana	None: will with collection permits	Eileen Ryce, MT Dept of Fish, Wildlife & Parks	(406) 444-2448	<a href="mailto:eryce@state.mt.us">eryce@state.mt.us</a>
Nevada	None	Jon Sjoberg, NV Dept of Wildlife	(775) 668-1532	<a href="mailto:sjorberg@ndow.org">sjorberg@ndow.org</a>
New Mexico	Immediate	Brian Lang, NM Dept of Game & Fish	(505) 476-8108	<a href="mailto:blang@state.nm.us">blang@state.nm.us</a>
North Dakota	Encouraged to report ANS	Lynn Schlueter, ND Game & Fish Dept.	(701) 662-3617	<a href="mailto:lschluet@state.nd.us">lschluet@state.nd.us</a>
Oklahoma	None	Curtis Tackett, OK Dept of Wildlife Conservation	(405) 521-4623	<a href="mailto:ctackett@odwc.state.ok.us">ctackett@odwc.state.ok.us</a>
Oregon	None	Mark Systma, Portland State University	(503) 725-3833	<a href="mailto:systemam@pdx.edu">systemam@pdx.edu</a>
South Dakota	None	Andy Burgess, SD Dept.Game, Fish, & Parks	(605) 773-2743	<a href="mailto:Andy.Burgess@state.sd.us">Andy.Burgess@state.sd.us</a>
Texas	?	Earl Chilton, TX Parks & Wildlife Dept.	(512) 389-4652	<a href="mailto:earl.chilton@tpwd.state.tx.us">earl.chilton@tpwd.state.tx.us</a>
Utah	Immediate: R657-60-4	Larry Dalton, UT DNR	(801) 652-2465	<a href="mailto:larrydalton@utah.gov">larrydalton@utah.gov</a>
Washington	?	Allen Pleus, WA Dept of Fish & Wildlife	(360) 902-2724	<a href="mailto:PLEUSAEP@DFW.WA.GOV">PLEUSAEP@DFW.WA.GOV</a>
Wyoming	Immediate	Mike Stone, WY Game & Fish Dept (temp)	(307) 777-4559	<a href="mailto:mike.stone@wgf.state.wy.us">mike.stone@wgf.state.wy.us</a>



# Appendix A - Results Reporting Template (Memorandum Report format)

Date:

To: (Area Office Contact - name, email, phone number)

From: (Director, Research and Development and/or ARRA Detection Project Manager)

Subject: ARRA Detection Project Monitoring Results – (POSITIVE, NEGATIVE or SUSPECT)

**ACTION REQUIRED:** (State reporting requirements)

Location: (Reservoir or water body)

Region:

State:

Detection Results Summary:

Sample Location	Sample Date	Microscopy Date	# veligers in 5ml	Confirmation* Date	Comments

\* Identify confirmation method: PCR or independent microscopy

Regional Mussel Task Force Coordinator: (name, email, phone number)

State ANS Coordinator: (name, email, phone number)

**BACKGROUND** (status of monitoring at this location)

**RESULTS** (includes level of confidence)

**CONCLUSIONS AND RECOMMENDATIONS**