Utah Division of Wildlife Resources' Attack against the Invasion of Quagga & Zebra Mussels

(2011 Boating Season Summary)

STATEWIDE AQUATIC INVASIVE SPECIES PROGRAM (AIS) SUMMARY

- **Budget, Personnel & Equipment for UDWR's AIS Program**
  - **FY12 Utah General Funds for UDWR's AIS Program: $1,350,000**
  - **FY12 Partner Funds Used by UDWR's AIS Program: $291,409**
    U.S. Bureau of Reclamation ($12,500), U.S. Forest Service ($42,856), Bureau of Land Management ($20,000), U.S. Fish & Wildlife Service ($29,861), Central Utah Water Conservancy District ($100,000), Emery Water Conservancy District ($10,714), Uintah Water Conservancy District ($12,500), Weber Basin Water Conservancy District ($10,244), Provo River Watershed Council ($42,000), PacifiCorp ($10,714)
    - The National Park Service at Lake Powell during the 2011 boating season spent over $1,000,000 on an outstanding quagga & zebra mussel program. This eliminated a need for UDWR to conduct a $193,000 AIS program at Lake Powell, which allowed a re-direction of funds to other parts of the State. UDWR does provide a $22,000 AIS grant each year to NPS. They have been able to double and triple UDWR's grant funds by using them as match for other AIS grants they have secured.
    - The Arizona Game and Fish Department assigns two technicians to work at Lake Powell in cooperation with the National Park Service in the conduct of its AIS program. The technicians are housed in UDWR's bunkhouse at Wahweap in Page, AZ.
    - The Idaho Department of Agriculture has contracted the Idaho State Parks at Bear Lake to conduct an AIS program very much like UDWR's program on the other half of the lake. Idaho assigns one technician and one decontamination unit to Bear Lake.
    - The Wyoming Game and Fish Department conducts an AIS program at Flaming Gorge Reservoir very much like UDWR's program on the other half of the reservoir. Wyoming assigns three technicians and one decontamination unit to the reservoir.
    - The Ute Tribe conducts an AIS program on tribal lands very much like UDWR's program. They assign necessary personnel and one decontamination unit to protect their multiple waters.
    - Many other agencies and organizations located in Utah conduct activities in support of the attack against aquatic invasive species. For example the U.S. Fish and Wildlife Service, U.S. Forest Service, Bureau of Land Management, Bureau of Reclamation and National Park Service direct program activities within their respective agencies toward the effort. Multiple water conservancy districts do the same. And, non-governmental organizations (e.g., Trout Unlimited, BASS, etc.) also participate in the fight. Not to forget that individual citizen boaters also help by appropriately decontaminating their boats.

- **FY11 Personnel (78) & Decontamination Units (41) Used in UDWR's AIS Program**
  - UDWR Aquatic Section Program
    - 1 Statewide AIS Coordinator (1.0 FTE)
    - 5 Region AIS Biologists (5.0 FTE)
    - 49 AIS Technicians—On-ramp Educators & Boat Inspection/Decontamination (15.11 FTE)
    - 15 AIS Technicians employed via contract by Utah State Parks and Recreation—15 for 3 months each (4.69 FTE)
    - 41 Watercraft Decontamination Units purchased with UDWR General Funds and partner funds between FY07 and FY11 (none purchased in FY12); assigned as follows:

      Northern Region (8 Decontamination Units): Bear Lake[1], East Canyon, Echo, Hyrum, Pineview (2), Rockport and Willard.

      [1]**Bear Lake (Idaho)**—Idaho Department of Agriculture has an additional decontamination unit sited at the Idaho Bear Lake State Park.

      Central Region (7 Decontamination Units): Deer Creek, Jordanelle, Strawberry (2), Utah Lake (2) and Yuba.

      [2]**Southern Region (11 Decontamination Units):** Fish Lake, Gunlock (shared with St George POE), New Castle, Otter Creek, Panguitch, Piute, roving unit (Kolob, Minersville, Pine Valley, Sand Cove), Sand Hollow (3) and Quail Creek.

      [2]**National Park Service, Lake Powell (Utah/Arizona):** National Park Service, using their funds between FY07 and FY11, placed five additional decontamination units around Lake Powell as follows:

      (a) Wahweap (double-sided semi-permanent reclaim unit);
      (b) Bullfrog (single-sided semi-permanent reclaim unit);
      (c) Antelope Point (trailer-mounted reclaim unit);
      (d) Hall's Crossing (trailer-mounted reclaim unit); and
      (e) Hite (trailer-mounted reclaim unit).

      [3]**U.S. Fish and Wildlife Service (Vernal Fisheries Office)**—USFWS provided an additional decontamination unit for statewide operations at Ports of Entry and other administrative check points, so UDWR would not have to pull a unit off line during those operations.

      Northeast Region (7 Decontamination Units): Flaming Gorge[4] (3), Pelican, Red Fleet, Starvation and Steinaker.

      [4]**Flaming Gorge (Wyoming)**—Wyoming Game & Fish placed an additional decontamination unit sited in the Buckboard Marina area.

      Southeastern Region (8 Decontamination Units): roving unit (Manti lakes), Electric Lake, Huntington North, Joe's Valley, Millsite, Scofield (2) and Ken's Lake-Recapture-Blanding Reservoirs area.

- UDWR Native Species Aquatic Program
  1 Native Aquatic Biologist—mollusk identification (0.05 FTE)
- UDWR Conservation Outreach Program
  1 Technical Writer (1.0 FTE)
- UDWR Law Enforcement Program
  1 Criminal Information Technician (0.50 FTE)
  5 Region Conservation Officers (2.51 FTE)

- **Outreach**
  - Public presentations about AIS were made in many places across Utah, including for multiple Chambers of Commerce and other civic groups, Utah Boat Show, International Sportsman Exposition, Vernal's Western Park Facility, Rocky Mountain Anglers Association, Utah Water Users Association, Utah Lake Festival, Provo River Watershed Festival, Friends of Strawberry Valley, June Sucker Recovery Program, public and private secondary schools across the state, 2011 Utah Nonpoint Source Water Quality Conference, NRCS Earth Day program, multiple university biology classes, and the Nature High Summer Camp.

  - AIS presentations were made to numerous natural resource management agencies across Utah.

  - Multiple consultations about AIS were provided to national organizations and for other states' AIS programs—UDWR's AIS program is recognized as one of the best in the United States.

  - Multiple media releases statewide occurred on the radio (30 in 2010—2011 data not available, but a similar level of activity occurred), television (28 in 2010—2011 data not available, but a similar level of activity occurred) and in local area or statewide newspapers (12). All of these media releases were promoted as news, and were without cost to UDWR. Regarding just the aforementioned television news releases, they were viewed by nearly 2.1 million folks and had a publicity value of $58,248.

  - 17,500 different viewers assessed UDWR's mussel web page (www.wildlife.utah.gov/mussels), learning about AIS issues and watercraft decontamination procedures.

  - 90 Fishing contests with several thousand participants occurred in 2011. Participants were all required to become Mussel-Aware Boaters by participating in an online course that earned them a Decontamination Certification Form valid for the entire year. 4,219 folks, which is a 17% increase over the previous year, took the course, including fishing contest participants.

  - Volunteers worked 6,070 hours or 2.92 FTE under authority of UDWR's Volunteer Program, targeting watercraft interdiction for AIS purposes, inspection for AIS and education about quagga & zebra mussel issues (Salt Lake City office

121 hours—2010 data, since 2011 data not available, but a similar level of activity occurred; Northern Region 1,325 hours—2010 data, since 2011 data not available, but a similar level of activity occurred; Central Region 1,982 hours; Southern Region 2,281 hours; Northeastern Region 24 hours; Southeastern Region 337 hours).

- 372,196 boats were interdicted statewide (Northern Region 120,000; Idaho State Parks at Bear Lake 3,975; Central Region 30,243; Southern Region 19,713; National Park Service at Lake Powell 175,000; Northeastern Region 16,317; Wyoming Game & Fish at Flaming Gorge 4,434; Southeastern Region 2,514). These numbers reflect an 8.9% decrease from 2010, which likely represents the depressed economy finally impacting boaters. Problematic boats were inspected; boat decontaminations occurred when needed; and all of the boat operators were educated about quagga and zebra mussel issues.

- **Public Surveys to Measure Outreach Effectiveness**
  - Approximately 60,000 unique registered boaters exist in Utah, representing 70,321 registered boats (2010 data provided by Utah State Parks and Recreation). 93% use a single-launch Decontamination Certification Form, which is available either online as a self-print-download or available at most boat launch facilities. The other 7% (3,618 in 2010) took opportunity to become certified as "Mussel-Aware Boaters" by taking a 45 minute online certification course, which provided them with a multi-launch Decontamination Certification Form valid for the entire boating season. A Decontamination Certification Form is required to be displayed in the launch vehicle with every boat launch in Utah.

  - UDWR completed two online feedback assessments in 2010 (analyzed in 2011) that provide measurement about effectiveness of outreach efforts to encourage Utah's boaters to properly display a required (1) Decontamination Certification Form at every launch, and to (2) decontaminate their boats after ever excursion. Decontamination is only required if a boat has been used within the last 30 days on a quagga or zebra mussel affected water, but routine decontamination is encouraged. The aforementioned assessments individually targeted each group. The single-launch form group had 391 statewide respondents; and the multi-launch form group had 644 statewide respondents. There may be differences between the two assessed groups, but overall UDWR's outreach and decontamination certification education success is evident as follows:
    - **Boat Use:** The single-use group makes more than four times the use of their boats for fishing vs. other recreational boating--ski, swim, explore, etc.--activity (4.4:1). The multi-launch group makes nearly equal use of their boats for fishing vs. other recreational boating--ski, swim, explore, etc.--activity (1.06:1).
    - **Knowledge:** The single-launch group showed more than 96% to be aware of the invasive mussel (quagga & zebra) threat to Utah's waters. And, 100% of the multi-launch group are aware, which in part stimulated their participation in the Mussel-Aware Boater Program. It is evident that the knowledge gap between the two groups is not substantially different, with

both groups being very aware of the invasive quagga and zebra mussel problem.

- **Proper Display of the Decontamination Certification Form:** Regarding display of Decontamination Certification Forms, 85% (single-launch group) to 100% (multi-launch group) of boaters indicated they routinely fill out and display the form. This would be viewed as a high success rate. However, covert observations of 426 boaters showed that only two-thirds of the boaters actually did fill out and display the forms. One-third of the boaters failed to display a form. Additional outreach combined with targeted law enforcement may improve this situation.
- **Decontamination Practices:** Regarding routine decontamination of boats following an outing, 83% (single-use group) to 87% (multi-launch group) indicate they perform an accepted decontamination. There is likely no substantive difference between the two groups. Across both groups most (77%) said they use the "Clean, Drain & Dry" method, while 6% use of the "Professional Decontamination" method, and 16% indicate they don't routinely decontaminate. However, covert observations of 426 boaters in 2010 as they removed their boats from waters statewide found that only 47% initiate a decontamination process, meaning 54% fail to initiate any decontamination. Possibly some complete the effort at home. Reported behavior vs. observed behavior appears to be markedly different. Thus, these results warrant a deeper investigation. Likely, an increased level of outreach could improve this situation.

  - Prior to 2008 when the Utah Aquatic Invasive Species Interdiction Act was passed, no boater in Utah had need to (1) display a Decontamination Certification Form or to (2) decontaminate their boats. The study's findings indicate that regardless of group, outreach and decontamination certification combined with limited law enforcement are mostly effective, minimizing the proportion of folks who fail to do either process. The goal is get 100% participation, so much work remains to be done, and the public seems to express intent to cooperate.

- **Decontaminations & Encrusted Boats**
  - UDWR's five regional aquatic invasive species biologists and several Utah State Parks & Recreation rangers across Utah; Idaho State Parks personnel at Bear Lake; National Park Service and concessionaire personnel, including Arizona Game & Fish personnel at Lake Powell; as well as Wyoming Game and Fish personnel at Flaming Gorge are certified "Level II Water Craft Inspection & Decontamination Trainers." This is a certified training program provided by the Pacific States Marine Fisheries Commission to specifically target boats encrusted with quagga and zebra mussels. These trainers have conducted multiple Watercraft Inspection & Decontamination Training I classes in association with management of Utah water bodies statewide.

  - 8,111 boats were decontaminated statewide due to their use on quagga or zebra mussel affected waters in North America during the previous 30 days (Northern

Region 9; Idaho State Parks at Bear Lake 9; Central Region 106; Southern Region 2,432—2,418 of these at Sand Hollow Reservoir; National Park Service at Lake Powell 4,000; Northeastern Region 1,289; Wyoming Game & Fish at Flaming Gorge 2; Southeastern Region 264).

- 19 boats were either reported by cooperators (e.g., marine sales and repair dealers) or discovered during routine UDWR or partner inspections (3) to be encrusted--one or more mussels--with quagga or zebra mussels prior to their launch in a Utah water body (includes 16 discovered by the National Park Service at Lake Powell). Many of the mussels were alive. All encrusted boats were decontaminated, quarantined and eventually allowed to launch.

- Scuba equipment for UDOT's bridge inspection contractor has routinely been decontaminated in recent years. However, they did not seem to work in Utah during 2011.

- Construction equipment for SP&R was routinely inspected and decontaminated, since they had been working in quagga mussel affected waters at Red Fleet Reservoir's state park and Sand Hollow Reservoir's state park in the previous 30 days.

- **Presence/Absence of Quagga & Zebra Mussels or other AIS**
  - 92 selected water bodies and facilities were sampled for AIS; most sites included a plankton sample for microscopy assessment to determine the presence or absence of larval (veligers) quagga or zebra mussel. And, some samples included PCR assessment for detection of DNA from AIS. The specific water bodies and results from 2007 thru 2011 can be viewed at http://wildlife.utah.gov/mussels/waters.php.

  - Sand Hollow Reservoir was previously classified as "infested" due to the find of a single, live adult (20mm) quagga mussel on the underwater side of a boat dock in late May 2010. Despite intense searches, which included substrate samplers, shoreline inspections, scuba diving and plankton tow assessment via microscopy, no further evidence of adults or veligers was found in 2011. However, PCR assessment of the plankton tow samples for dreissenid showed evidence for quagga mussel DNA throughout most (April through November) of the 2011boating season. This find does not affect the reservoirs current classification as infested, and will not result in modification to the ongoing implementation of the control plan.

  - Quail Creek Reservoir is connected via a pipe to Sand Hollow Reservoir. Though the pipe has not flowed water between the two water bodies for several years. Despite intense searches, which included substrate samplers, shoreline inspections, scuba diving and plankton tow assessment via microscopy, no evidence of dreissenid adults or veligers has ever been found. Interestingly, PCR assessment of the plankton tow samples for dreissenid showed evidence for

quagga mussel DNA during just the September/October pooled sample from the 2011boating season. No other months before or since have shown DNA evidence for dreissenid mussels. Since this find was not supported by microscopy or additional DNA finds, it does not affect the reservoirs current classification as "not detected," and will not result in modification to the ongoing implementation of the control plan.

        - Regarding Red Fleet Reservoir and Electric Lake, both evidenced Dreissena veligers in 2008 (microscopy & PCR), resulting in "detected" classifications. But, despite monthly plankton and PCR assessments during the boating seasons of the intervening years (2009-2011), no other Dreissena evidence has been found. Thus, both waters were declassified from "detected" to "inconclusive." They will remain in the lower classification for the next couple of years (2012 & 2013), and if no other discovery for dreissenid evidence occurs, the water bodies will likely be reclassified as "not detected."

    - Huntington North Reservoir, Joe's Valley Reservoir, Midview Reservoir (Ute Tribe) and Pelican Lake each were classified as "inconclusive" in 2008 relative to Dreissena mussel veligers due to positive microscopy followed by negative PCR. But, despite monthly plankton and PCR assessments during the boating seasons of the intervening years (2009-2011), no other Dreissena evidence has been found. Thus, all four waters were declassified from "inconclusive " to "not detected." Such a process had already occurred for Lake Powell in late summer 2010; it was classified as "inconclusive" in 2007 due to conflicting microscopy and PCR results. Lake Powell has shown no further evidence of Dreissena via microscopy and PCR of plankton tow samples in 2008, 2009, 2010 and 2011. So, it was re-classified as "not detected" in mid-summer 2010, too.

    - No Dreissena veligers were detected via plankton samples and follow-up microscopy in Utah during 2011.

- **Law Enforcement**
    - 118,742 contacts were made statewide by natural resource law enforcement officers for AIS purposes specifically targeting compliance with aquatic invasive species regulations (UDWR statewide 12,413; SP&R statewide many, but not documented; Idaho State Parks at Bear Lake unknown; Wyoming Game and Fish at Flaming Gorge 4,434; NPS at Lake Powell 100,000).
        - Many verbal warnings were made by natural resource law enforcement officers for minor non-compliance issues regarding aquatic invasive species regulations. In many instances UDWR (7,677) and SP&R (572) officers placed a printed, non-compliance notice on boat launch vehicles that failed to display a Decontamination Certification Form. A FatPot database tracking those notices and the verbal warnings allowed enforcement officers to identify 2nd time offenders, who typically were

then issued written warning citations or Notice to Appear in Court citations.

- 540 written citations, as either a Notice to Appear in Court or a written warning, were issued by natural resource law enforcement officers for non-compliance with aquatic invasive species regulations (UDWR statewide 49; SP&R statewide 13; Idaho State Parks at Bear Lake 0; Wyoming Game and Fish at Flaming Gorge 0; NPS at Lake Powell 478).
- Violations types:
    - Possession of prohibited AIS
    - Failure to certify decontamination prior to launch
    - Failure to display Decontamination Certification Form
    - Violation of AIS Rule