Town of Silverton

Post Office Box 250 Silverton, Colorado 81433-0250

Telephone (970) 387-5522 Fax (970) 387-5583

November 21, 2011

Gregory Johnson
Colorado Water Conservation Board
Water Supply Planning Section
1580 Logan Street, Suite 200
Denver, CO 80203

RE: MOLAS LAKE PROJECT
Town of Silverton, Colorado
Identification #SPK-200675417

Dear Gregory:

Please accept the enclosed documentation regarding the completion of the Molas Lake Project. I have attached the following:

1. Invoice and Reimbursement Requests on Town letterhead;;
2. Subcontractor Invoices;
3. Project Expenditure Spreadsheet;
4. Photos of the Flume Installation; and
5. Acceptance of Construction and Approval to Store Water Notification from the Division of Water Resources.

All phases of the project have been completed and the flume has been installed. If you have any questions or require any additional information, please do not hesitate to give me a call.

Sincerely,

Dave Michaelson
Town Planner

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF WATER RESOURCES

John W. Hickenlooper
Governor

Mike King
Executive Director

Dick Wolfe, P.E.
Director/State Engineer

May 24, 2011

Jason S. Wells
Town Administrator
Town of Silverton
P.O. Box 250
Silverton, CO 81433

When replying, please refer to:
BIG MOLAS LAKE DAM
Water Division 7, DAMID 300138
Construction File No. C-1926

Subject: Acceptance of Construction and Approval to Store Water

Dear Mr. Wells:

A final inspection of the reservoir enlargement work at the existing Big Molas Lake dam was performed by Garrett Jackson and Matt Gavin of our office on August 27, 2010, to confirm that the construction of this project had been substantially and satisfactorily completed. Subsequent to the inspection, our office received a certification of completion letter, as-constructed drawings, and other project completion documents from your engineer in accordance with Rule 10 of Colorado's "Rules and Regulations for Dam Safety and Dam Construction".

Based on the results of the final and other construction inspections and on our review of the documents submitted by your engineer, this project appears to have been satisfactorily completed and generally constructed in accordance with the approved plans and specifications. Therefore, the project is accepted for full use. **You may store water in the reservoir whenever water is legally and physically available.**

The construction did not increase the physical height of the dam. The Big Molas Lake dam, as constructed, has by definition a maximum vertical dam height of 5 feet and a dam crest length of approximately 130 feet. The reservoir created by the dam embankment has a storage capacity of approximately 113 acre-feet with the reservoir surface at elevation 10,500 feet, the crest elevation of the emergency spillway. Big Molas Lake dam is a Small Low Hazard dam.

You are reminded that the Town of Silverton, as the owner of this facility, is responsible for the safety of the structure and is liable for any loss of life and/or damages caused by failure of the dam or appurtenant structures. Acceptance of this construction project by the State Engineer does not relieve the dam owner from this liability or from any other statutory obligations. Therefore, it is in the owner's best interest to operate and maintain the facility in a manner such that the safety of the dam and the general public are not jeopardized. We are enclosing a copy of Rules 12 and 15 of the Rules and Regulations for your reference and use. These rules pertain to general maintenance items and the owner's responsibilities, respectively.

If you have any questions, please do not hesitate to contact Matt Gavin in our Durango office at (970) 247-1845.

Sincerely,

Mark R. Haynes, P.E.
Chief, Safety of Dams Program

Enclosures: Rules 12 and 15 of the Rules and Regulations for Dam Safety and Dam Construction

xc: Rege Leach, Division Engineer (w/o enclosures)
Garrett Jackson, Design Review Engineer (w/o enclosures)
Matt Gavin, Dam Safety Engineer (w/o enclosures)
Mark Mackie, Design Consultant (w/o enclosures)

EXCERPTS FROM
COLORADO RULES AND REGULATIONS FOR
DAM SAFETY AND DAM CONSTRUCTION

Pertaining to Acceptance of Construction

Rules 12 and 15

Rule 12. General Maintenance, Ordinary Repairs, and Emergency Actions:

12.1 **General Maintenance** - General maintenance and ordinary repairs that do not require prior approval of the State Engineer for the purpose of this Rule shall be those activities that do not impair the safety of the dam. These maintenance and repair activities include:

12.1.1 Removal of brush or tall weeds.

12.1.2 Cutting of trees and removal of slash from the embankment or spillway. Removal of small stumps is acceptable provided no excavation of more than 3 feet into the embankment occurs. An engineer must oversee removal of trees and stumps larger than 12" diameter.

12.1.3 Rodent control, removal or extermination. Repair of minor rodent damage is acceptable provided it does not involve excavation of more than 3 feet into the embankment.

12.1.4 Repair of erosion gullies on the embankment or in the spillway. Large gullies that have already weakened the dam must be repaired in accordance with Rule 6.

12.1.5 Surface grading of the embankment crest or spillway to eliminate potholes and provide proper drainage provided that the freeboard is not reduced. Material placed on the dam crest to restore the design freeboard must be compacted to specifications outlined in Rule 5. The State Engineer must be provided notice prior to placement of material on the dam crest of greater than 1 foot in depth for approval. Placement of material in excess of 1 foot in depth to provide freeboard is not considered general maintenance.

12.1.6 Placement of additional riprap and bedding on the upstream slope, or in areas of the spillway that have sustained minor damage. Such placement shall be limited to restoring the original riprap protection where the damage has not yet resulted in weakening of the dam. An engineer must oversee restoration of the embankment.

12.1.7 Painting or caulking metal structures, or lubricating mechanical equipment.

12.1.8 Patching, sealing, or caulking spalled or cracked concrete surfaces to prevent deterioration.

12.1.9 Removing debris, rock, or earth from outlet conduits, outlet channels or spillway channels.

12.1.10 Patching or sealing surface damage to prevent further deterioration within outlet conduits.

12.1.11 Replacement of worn or damaged parts of outlet valves or controls to restore to original condition.

12.1.12 Repair or replacement of fences intended to keep traffic or livestock off the dam or spillway.

12.1.13 Landscaping of new and existing dams and spillway channels is not general maintenance and will not be allowed without the prior approval of the State Engineer. No trees or large vegetation shall be planted within 25 feet of the footprint of the dam.

12.2 **Excavation and Determination of General Maintenance** - General maintenance and ordinary repair which may impair safety such as excavation into or near the dam, construction of new appurtenant structures for the dam, and repair of damage which has already significantly weakened the dam must be done in accordance with Rule 6. When questions arise concerning this Rule, the determination of general maintenance and ordinary repair will be made by the State Engineer.

12.3 **Emergency Action** - Emergency actions not impairing the safety of the dam may be taken before consultation and guidance can be provided by an engineer, and do not require prior approval of the State Engineer. Emergency actions are interim solutions only and may not serve as a permanent solution to the problem being addressed. Additional remedial actions may be required after the emergency passes. Emergency actions may include:

12.3.1 Stockpiling materials such as riprap, earthfill, sand, sandbags and plastic sheeting;

12.3.2 Lowering the reservoir level by making controlled releases through the outlet or a gated spillway, by pumping, or by siphoning. Where large releases are to be made, the Division Engineer shall be notified;

12.3.3 Armoring eroding areas by placing sandbags, riprap, plastic sheeting, or other available material;

12.3.4 Plugging leakage entrances on the upstream slope;

12.3.5 Increasing freeboard by placing sandbags or temporary earthfill on the dam;

12.3.6 Diverting flood waters around the reservoir or closing inflow diversions;

12.3.7 Constructing training berms to control flood waters;

12.3.8 Placing sandbag ring dikes around boils at the downstream toe to provide back pressure; and/or

12.3.9 Removing obstructions from outlet or spillway flow areas.

12.4 **Emergency Excavation** - Lowering the water level by excavating the spillway or embankment is prohibited unless failure is imminent.

12.5 **Emergency Notification** - The State Engineer shall be notified as soon as reasonably possible of any emergency condition that exists and any emergency action taken with or without prior approval of the State Engineer.

12.6 **Emergency Action Plan** - For all High and Significant Hazard dams, the Emergency Action Plan must be implemented in conjunction with any emergency actions taken in accordance with Rule 12.

Rule 15. Dam Owner's Responsibilities:

15.1 **Outlet Inspection** - It is the dam owner's responsibility to provide for inspection of outlet facilities associated with the dam. The frequency of outlet inspections and the requirements of those inspections are as follows:

15.1.1 High and Significant Hazard dams shall receive a Type A outlet inspection in conjunction with safety inspections, and Type B inspections at least once every ten years unless the condition indicates more frequent inspections are necessary. A Type B inspection of the entire outlet conduit shall only be required on dams without upstream gates if ordered by the State Engineer in conformity with Rule 15.1.4. Type B inspections may be waived where the condition of the outlet conduit would not be considered detrimental to the safety of the dam.

15.1.2 Low Hazard and NPH dams shall receive a Type A outlet inspection in conjunction with routine periodic safety inspections of the dam. A Type B inspection may be required by the State Engineer to determine the safe storage level.

15.1.3 Type A outlet inspections shall consist of observation of exposed surfaces of the inlet and discharge structures, control valves or gates and vaults; a test of the outlet valve(s) for proper operation, observation of the downstream end of the conduit and adjacent embankment for leakage; and observation of the dam (upstream slope, crest, downstream
slope or natural ground) in the vicinity of the outlet alignment for signs of distress which would indicate failure of the outlet system.

15.1.4 Type B outlet inspections shall consist of a complete Type A inspection, a close inspection of the interior of the conduits, outlet wells, and access ways, and operation of the outlet valve(s) or gates through the full operating range. In cases where the conduits are too small for a person to safely enter, the owner shall provide for an inspection using video or other remote sensing equipment capable of detecting flaws or imperfections within the conduit. A written report of inspection findings, including the opinion of the owner's engineer, must be submitted to the State

Engineer unless waived by the State Engineer for good cause. A Type B inspection of the normally inundated outlet conduit of a dam without upstream guard gates shall be required only when existing baseline data available to the State Engineer is inadequate to permit an evaluation of the condition of the outlet conduit. Thereafter, such inspections shall only be required if the criteria set forth in ACER Technical Memorandum No. 6, U.S. Department of the Interior, Bureau of Reclamation, 1985, (later amendments, editions or subsequent publications not included) indicates the need for an inspection. In ordering such inspections, the State Engineer shall coordinate with the dam owner and make all reasonable efforts to prevent expense and waste of water consistent with ensuring dam safety.

15.1.5 At any time the water level in a dam without upstream gates on the outlet conduit will be lowered to the invert of the conduit, or the normally inundated conduit will be otherwise dewatered and available for inspection, the dam owner shall inform the State Engineer in writing. The dam owner is responsible to provide for inspection of outlet facilities associated with the dam and may take advantage of the low water level conditions to perform the necessary outlet inspection. The State Engineer may require an inspection of the conduit when conditions warrant and/or based on the period of time since the last outlet inspection.

15.2 **Owner Observations** - The owner is responsible for ensuring frequent observation of the dam, unless prohibited by weather or difficulty of access to the dam, especially at times when the reservoir is full, during heavy rains or flooding, and following an earthquake. When the reservoir water level is greater than half the full storage capacity, High and Significant Hazard dams shall be observed at least twice a month, and a Low Hazard dam shall be observed at least every three months. The observations shall be conducted in accordance with methods acceptable to the State Engineer. Conditions which threaten the safety of the dam must be reported to the State Engineer in accordance with the Emergency Action Plan for High and Significant Hazard dams as soon as reasonably possible, after discovery of the conditions. If dam failure appears imminent, the county sheriff (or local emergency manager) must be immediately notified. The owner is responsible for the safety of the dam and shall take action to lower the reservoir if it appears that the dam has weakened or is in danger of failing.

15.3 **Monitoring Instrumentation** - The owner of a dam is responsible for installing, maintaining, and monitoring the required instrumentation. All instrumentation plans shall be submitted to the State Engineer for review and approval prior to installation of instrumentation, survey monuments, weirs, flumes or other measuring devices.

15.3.1 The following minimum instrumentation is required on existing dams; however, the State Engineer may require additional instrumentation when he deems it necessary.

15.3.1.1 High Hazard dams shall have survey monuments to monitor horizontal and vertical movement of the dam and appurtenant structures, and weirs, flumes or other structures that are acceptable to the State Engineer to monitor seepage.

Installation of piezometers to measure the internal water surface of the embankment or adjacent abutments and foundation of the dam may be required by the State Engineer for determination of the safe storage level in the reservoir.

15.3.1.2 Significant and Low Hazard dams shall have weirs, flumes or other structures that are acceptable to the State Engineer to monitor seepage. Significant Hazard dams may require piezometers be installed as described in Rule 15.3.1.1.

15.3.1.3 All dams shall have gage rods pursuant to Rule 5.

15.3.2 The dam owner shall measure seepage during each routine observation of the dam. Owners of High Hazard dams shall also be responsible for providing first order surveys of horizontal and vertical movement monuments. These surveys are required annually for five years (including the year of installation of the monuments) on new and recently enlarged dams, and then once every five years thereafter. The State Engineer may also approve other methods for monitoring movement monuments on the dam and may require monitoring at any frequency deemed necessary based upon review of inspection data and past measurement results.

15.3.3 The dam owner is responsible for ensuring that all instrumentation data is properly recorded in an acceptable format and sent to the State Engineer annually. The State Engineer may require that instrumentation data for High and Significant Hazard dams be evaluated by the owner's engineer and the analysis sent to the State Engineer annually, unless more frequent reporting is required by the State Engineer.

15.3.4 The dam owner shall promptly notify the State Engineer of any abnormal changes in the dam based on the results of evaluation of instrumentation data, as compared to historical patterns and trends.

15.4 **Responsibility for Maintenance** - The owner is responsible for adequate and timely maintenance of the dam. The owner shall establish an annual maintenance plan to ensure that the maintenance, as identified in Rule 12, is accomplished.

15.5 **Trash Racks** - The owner shall ensure that trash racks are installed on all outlet structures unless waived in writing by the State Engineer.

15.6 **Change In Ownership** - Changes in ownership of a dam shall be immediately filed with the State Engineer.

Second Annual Mitigation As Built Report

To the

Army Corps of Engineers
Southwest Colorado Regulator Office
Durango, Colorado

For the

Molas Lake Project
Town of Silverton, CO

Identification # SPK-200675417-DC

Owner – Town of Silverton

Agent/Consultant – Alpine Environmental Services
8185 C.R. 203
Durango, CO 81301
Phone: (970) 385-4138

December, 2010

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1.0 PROJECT OVERVIEW

1.1 *Permit Number:* # SPK-200675417-DC
Town of Silverton

1.2 *Designated Agent for Monitoring*:
Alpine Environmental Services
8185 C.R.203
Durango, CO
(970) 385-4138; wsimon@frontier.net
Inspection Dates: Periodically throughout the summer and fall of 2009.

1.3 *Project Description*:
The project consisted of the following 3 phases:
1) Action I-Molas Lake Spillway Improvements: Dam safety and control measures to include spillway improvements and the installation of a Parshall monitoring flume resulting in the temporary impact to wetlands of 1570 sq. ft. and permanent impact of 759 sq. ft.

The dam improvements are a requirement imposed by the State Engineer, Division of Water Resources, to improve the small earthen dam at the southern end of Molas Lake. It was be necessary to remove some vegetation so that a concrete spillway could be constructed within the earthen dam. The concrete structure consists of a box culvert spillway with wing walls on both the lake-side and stream-side. The improvements will not alter the elevation or holding capacity of the lake. Additional mitigation from Action III is designed to reduce sediment loading and improve water quality in Molas Lake.

A mitigation ratio of 1.5:1 would result in 1139 sq. ft. of restored wetlands from non-vegetated areas Mt-1 through Mt-7. *(Vegetative growth of restored wetlands on schedule in 2010.*

2) Action II-Molas Lake Ditch Improvements: Improvements to the Molas Lake diversion ditch are necessary to regulate the flow of water in the ditch and to maintain water flow to the wetland areas that Molas Creek supports. The improvements are a requirement imposed by the State Engineer, Colorado Division of Water Resources (CDWR) and the U.S.F.S. Diversion ditch improvements will include installation of a diversion structure, a Parshall measuring flume, a waste gate and sedimentation pond, and possibly some ditch cleaning,

Mitigation ratio of 1.5:1 should result in 1380 sq. ft of newly restored wetlands in sites Mt-1 through Mt-7. Wetland restoration is designed to replace lost function and values due to wetlands impacted from the installation of the diversion, waste gate, flume, and sedimentation basin. In addition, upland portions of Mt-1 through Mt-2 and restoration of denuded areas involved with Action III are designed to reduce sediment loading and improve water quality in Molas Lake.

Depending upon success and hydrological conditions of the mitigation sites it may not be possible to meet the total 2519 sq. ft. of restored wetlands anticipated. For this reason, as well as the practicality of employing best management practices on

this project, the Town has committed to improving water quality in Molas Lake and nearby wetlands by restoring denuded areas with a soil and vegetative cover and implementing storm water controls. The road beyond the dam is to be closed, except for emergency access and vegetation established. These actions in conjunction with wetland mitigation are designed to mitigate the permanent loss of 1679 sq. ft. of wetlands. *All components completed in November, 2009; 2010 site inspections show good hydrophytic vegetative cover in temporary impact areas, restored wetland areas, and the previously denuded upland areas surrounding the lake that have been restored to minimize sediment transport into Molas Lake. .*

A concrete diversion structure, flume, and concrete waste gate will displace a minimal amount of wetland (140 sq. ft.). The sedimentation pond and access road will occupy 780 sq. ft. of wetland space used periodically to clean out accumulated sediments. Total permanent impact to jurisdictional wetlands is 920 sq. ft. It was anticipated that 2349 square feet of wetland would be temporarily impacted to accommodate construction. In the fall of 2009 actual temporary impact following construction was estimated to have been less than 1000 sq. ft.. However in the spring of 2010 the project contractor re-entered the site to backfill around the waste gate structure and created an additional 1000 sq. ft. of temporary impacts thus bring the total temporary impacts to 2000 sq. ft. *Completed in December, 2009; 2000 sq. ft. of temporary impacted areas show excellent hydrophytic vegetative growth in 2010. Wetland restoration (Mt. 1 – 7) for the permanently impacted 920 sq. ft. of Action II is proceeding very well.*

3) Action III-Molas Lake Park Campground Improvements: Improvements will include a reduction in the number of camp sites, reduction in roads and access to the southwest end of the lake, implementation of some drainage measures including sedimentation collection ponds, campsite restoration and campsite improvements. Waters of the nation were not directly impacted however road reconstruction, surfacing, drainage ditch and sediment capturing ponds, and application of soil media and revegetation of large areas denuded by overuse has resulted in significant reduction of sediment loading to Molas Lake and associated wetlands. *Completed in November, 2008; 2009 and 2010 monitoring indicates that these areas have been nicely restored with upland vegetative cover of native species of grass and forbs.*

1.4 *Location Description*:
Action I : The Molas Lake Park Spillway is located approximately 4.5 miles south of Silverton, CO on the south side of US Highway 550, San Juan County (Figure 1 – Vicinity Map)

Action II: Molas Lake Ditch – see Figure 1

Action III: Molas Lake Park Campground – see Figure 1

1.5 All compensatory mitigation commenced in September of 2008 and was completed in October, 2009. Some minimal hand work (transplanting, seeding, and mulch application) was completed in the early summer of 2010 for temporary impacts associated with the completion of Action II.

1.6 *Are Performance Standards Being Met*:
Action III improvements have been highly successful with ground cover exceeding 60% on all previously denuded areas adjacent and/or draining into Molas Lake. Compensatory wetland mitigation sites Mt-1 through Mt-7 have been completed but most of these areas were not finished until the late fall of 2009. Mt- 6, 7, and a portion of 4 were completed in 2008 and have transplanted vegetation which are well established. Overall performance standards are being met; no noxious weeds observed.

1.7 *Corrective/Maintenance Activity Dates*:
Although closely monitored throughout the growing season, corrective actions were not deemed necessary in 2009. Some reseeding and mulch applications were completed in 2010 to address remaining partially vegetated areas at Mt-2 and Mt-3. In addition, temporary impacts associated with Action II were seeded and mulched resulting in good hydrophytic seedling development by the fall of 2010.

1.8 *Recommendations for additional Corrective/Remedial Actions*:
All temporary impacts and compensatory mitigation will be monitored periodically during the 2011 growing season and corrective actions implemented as needed.

2.0 REQUIREMENTS
Monitoring will consist of yearly estimates of vegetative coverage, percentage of coverage dominated by hydrophytic vegetation, and photo-documentation. Total area of restored wetlands as well as revegetated uplands draining into Molas Lake will be quantified. Sediment retention structures will be quantified and maintained.

(A gate to prevent non-emergency vehicular traffic from crossing the dam and proceeding on the old road has yet to be installed. This requirement has yet to be completed by the Town of Silverton although a temporary barricade remains in place to prohibit vehicular traffic).

3.0 SUMMARY DATA

Construction involved with Actions I, II, and III are now complete. A permanent gate remains to be installed at the dam to prevent vehicular traffic and some minimal transplanting and/or seeding and mulching might is advised for the area immediately adjacent the diversion structure (Mt-1).

Transplanting of willows and displaced vegetation involving Action I, 2008, was quite successful. The largest of the willows (>1" in diameter) did not transplant well however. All upland areas of Action III were successfully revegetated by transplants and/or seeding and mulched. Vegetative cover exceeds expectations. Displaced wetland vegetation from Action II, 2009, was immediately transplanted into Mt-1 and Mt-4 in the late fall of 2009 and did well in 2010. The denuded areas of Mt-2, 3, and 5 were seeded and mulched in the fall of 2009 as well as were temporary impacts to adjacent wetlands associated with Action I. These also have done well in 2010.

Performance standards for the second year of monitoring exceed expectations.

During dam embankment construction (Action I), a depression was created in an upland area from here forward referred to as Mt – 8. In the fall of 2009 the area was compacted and soil was added in hopes that water would collect in the area and be able to sustain a wetland community. It was seeded with hairgrass *(Descampsia caespitosa)*, a hydrophytic native grass. This depression retained surface water up to 1' in depth throughout the growing season of 2010 and a substantial cover of the hairgrass was developed. This could result in a bonus wetland to ensure a higher ratio of created wetlands than the 1.5 to 1 originally anticipated.

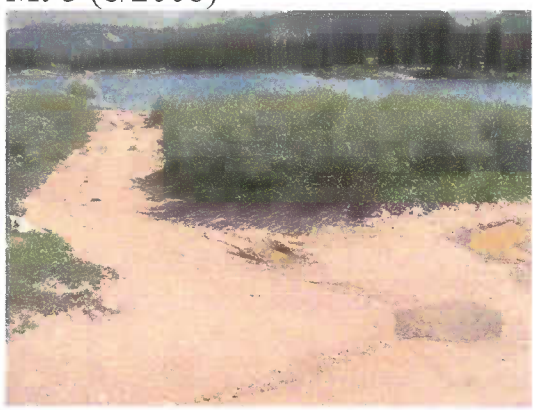
Mitigation Pictures - Actions 1 & 2

Before

Mt-1 (8/2008)

Mt-2 (8/2008)

Mt-3 (8/2008)



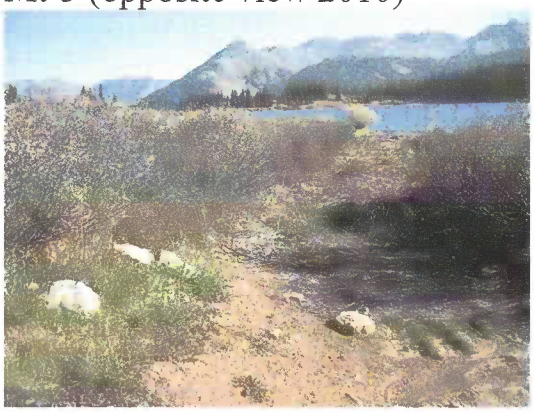
Mt-4 (south 2/3) (8/2008)

Fall, 2010

Mt-1 (10/2009)

Mt-2: (10/2010)

Mt-3 (opposite view 2010)

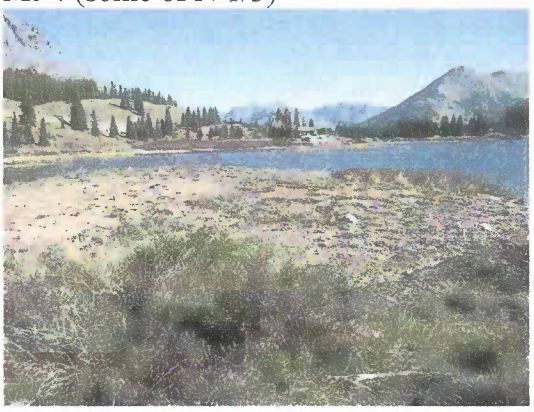


Mt-4 (S. 2/3) (10/2010)

Mt-4 (North 1/3)

Mt-4 (some of N 1/3)

Mt-5 the peninsula



Mt-5 (part of peninsula 2010)

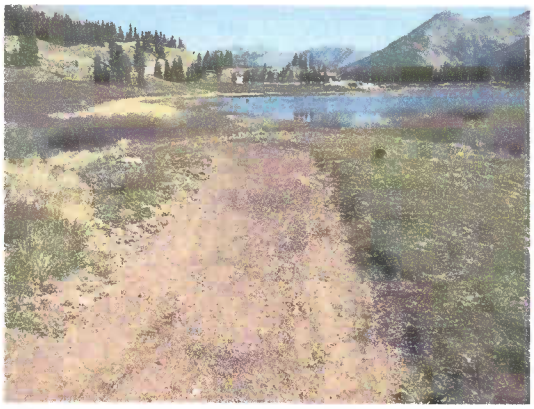
Mt-6 (east ½)

Mt-6 (east ½) (10/2009)

Mt-6 (west 1/2)

Mt-6 (west ½) (10/2009)

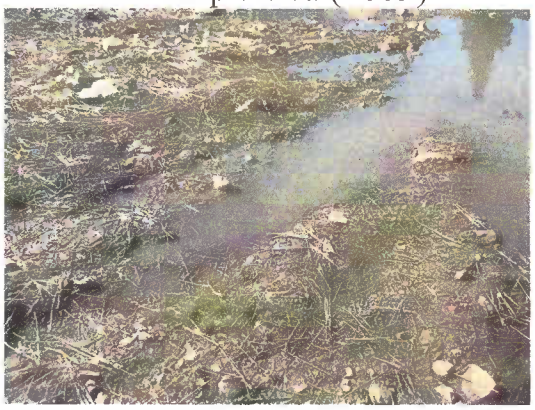
Mt-7



Mt-7 (2008 after transplants)

Mt-8 Barrow pit area (2009)

Mt-8 Barrow pit w/wetland feature (2010)



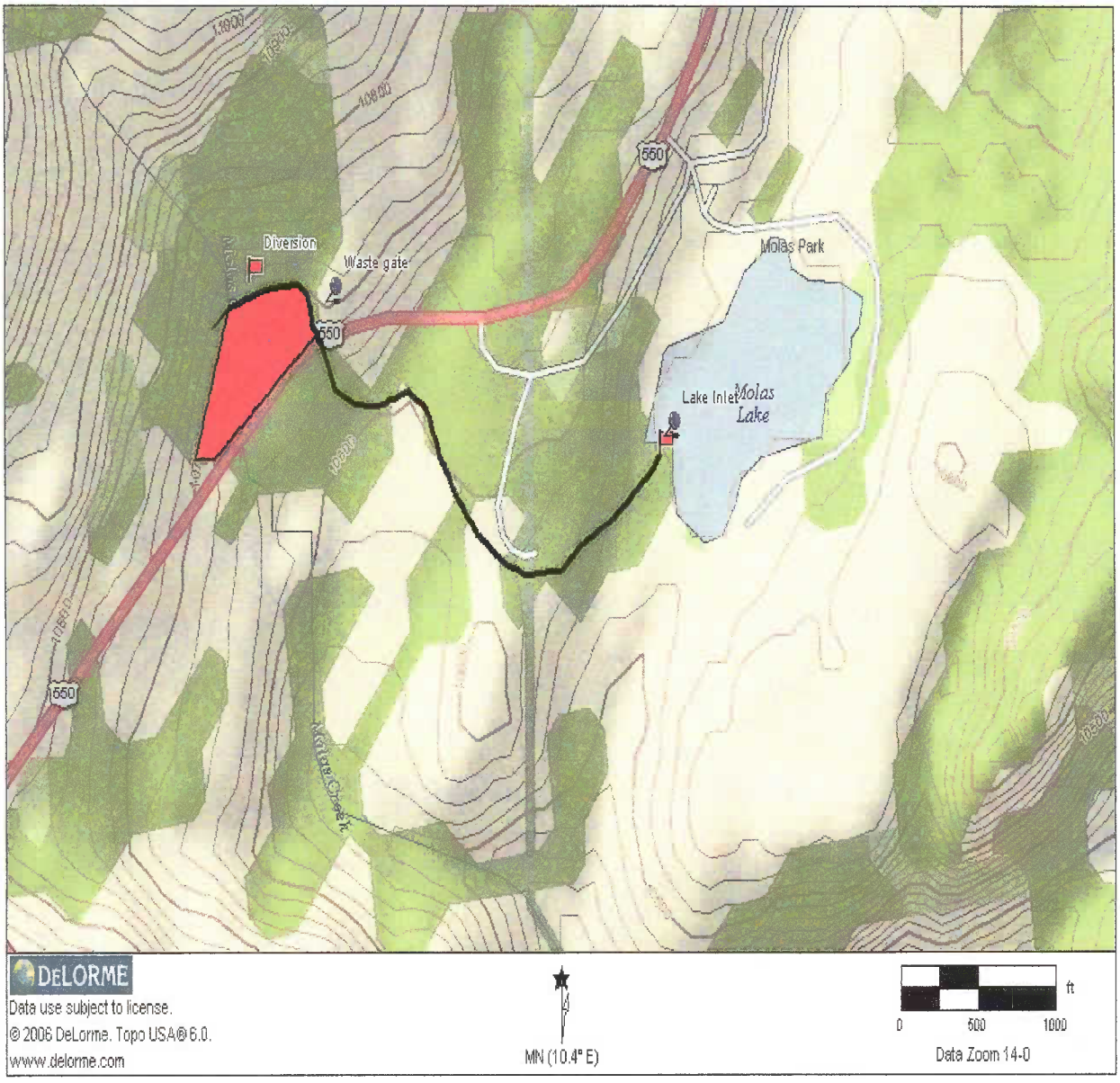
Mt-8 (2010)

Photos of Action 3 -- Sedimentation Control and Upland Restoration

See 2009 Mitigation Report – all areas not shown in photos of Action 1 and 2 have been successfully revegetated with over 60% vegetative cover.

4.0 MAPS AND PLANS

FIGURE 1



5.0 CONCLUSIONS

The mitigated areas have performed as well as expected or better for the second year. While the transplanted area is already well established the seeded areas may take a few years to become fully established due to the cold climate and short growing season. Noxious weeds have not threatened the mitigation areas at this time.