

Staff Report

for Board of Directors Meeting of June 28, 2017

TO: Board of Directors

FROM: Brian Powell

DATE: June 19, 2017

SUBJECT: NID Vegetation Management Program

MAINTENANCE DEPT

RECOMMENDATION: Presentation and Discussion of the NID Vegetation Management Program

BACKGROUND: Brian Morris, Assistant Superintendent of the Vegetation control section will give a presentation of the vegetation management program that is currently conducted at NID.

The presentation will include discussion of methods of vegetation control for the terrestrial weeds and aquatic weeds that affect the raw water canal system in Nevada and Placer Counties. These methods include the reduction of vegetation with and without the use of herbicides. He will also discuss some alternate methods of vegetation control and the general costs of vegetation control at NID.

BUDGETARY IMPACT: No Budget Impact in this discussion at this time

NEVADA IRRIGATION DISTRICT



Vegetation Management

Presenter:

**Brian W. Morris, PCA, QAL
Assistant Maintenance Superintendent**

June 28, 2017



Overview

- Vegetation Management Program**
- Chemical Controls**
- Training and Education**
- Regulatory and Inspections**
- Costs**

The background features a soft, light green gradient. In the upper left corner, several green leaves are shown with numerous water droplets on their surfaces. Below the leaves, a series of concentric ripples emanate from a central point, suggesting a water droplet has just fallen into a pool of water. The overall aesthetic is clean, fresh, and natural.

Vegetation Management Program

☞ Weed Management ☞

Goal

The “goal” of the Vegetation Management Program is to support the District’s Mission to:

“... provide a dependable, quality water supply; continue to be good stewards of the watersheds, while conserving the available resources in our care.”

The Vegetation Management Program strives to implement an Integrated Pest / Weed Management Approach in an effort to support the District’s Mission.

☞ Weed Management ☞

Weeds

Negative effects:

- Safety Hazards
- Restricted Water Flows
- Reduced Water Storage
- Water Loss from Plant Uptake and Root Wicking
- Water Quality and Public Health

☞ Weed Management ☜

Weeds

☐ Safety Hazards



∞ Weed Management ∞

Weeds

□ Restricted Water Flows



☞ Weed Management ☞

Weeds

- ☐ Reduced Water Storage



☞ Weed Management ☜

Weeds

- ☐ Reduced Flows from Plant Uptake



☞ Weed Management ☜

Weeds

- ☐ Water Quality and Public Health



☞ Weed Management ☜

Integrated Weed/Pest Management Approach

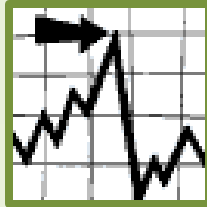
An approach to weed management using a combination of cultural, physical, biological and chemical methods to manage weeds.



☞ Weed Management ☜

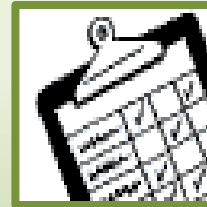
Integrated Weed/Pest Management Approach

Thresholds



Monitoring

Forecasting



Evaluation & Plan

Record & Report



Regulation

Method Alternative



Method Alternative

☞ Weed Management ☜

Vegetation Control Crew



☞ Weed Management ☞

Methods

NID's methods include:

- Grazing
- Thermal Unit
- Biological Control
- Hand Cleaning
- Mechanical Cleaning
- Weed Tarping
- Herbicides

☞ Weed Management ☜

Methods

☐ Grazing

- Little supervision
- No fossil fuel burned
- Biological method
- Drift/escape
- Time
- Waste bio-product
- Not used at any treated facilities



☞ Weed Management ☜

Methods

☐ Thermal Unit

- Controlled by steam
- Very slow method
- Large fuel cost
- Promotes growth
- Weather



☞ Weed Management ☜

Methods

☐ Biological Control

- Puncturevine weevil



- Scotch broom seed beetle



☞ Weed Management ☜

Methods

☐ Hand Cleaning

- Can be done anytime
(no weather constraints)
- Labor intensive
- Slow method
- Soil disturbance



☞ Weed Management ☜

Methods

☐ Mechanical Cleaning

- Effective spot treatment
- Impact to soil
- Timely
- Turbidity
- Weeds dispersed



☞ Weed Management ☜

Methods

☐ Weed Tarping

- Permanent soil cover
- Blocks sunlight
- Prevents adequate water absorption
- Prevents weed germination



☞ Weed Management ☜

Less Invasive Methods

☐ Hand Cleaning / No Spray

- Weed eaters
- Hook forks
- No Spray Agreements



NEVADA IRRIGATION DISTRICT
MAINTENANCE DEPARTMENT
VEGETATION CONTROL PROGRAM

No Spray Agreement

This AGREEMENT is made and entered into this ____ day of _____, 20____, by and between NEVADA IRRIGATION DISTRICT, a public agency formed and existing under the laws of the State of California (hereinafter "NID" or "District"), and _____, an individual owning that property within NID boundaries identified as Assessor Parcel Number(s) _____ (hereinafter "Landowner").

WITNESSETH

WHEREAS, _____, in order to access, and to operate and maintain _____ lands which traverse or adjacent to _____ agreement (hereinafter "Premises"),

WHEREAS, pursuant to _____ policies, NID has the duty to control vegetation or _____ adjacent to NID facilities, including the sides and tops of canals;

WHEREAS, it is NID's practice to control weeds and other vegetation on the sides and tops of canal and ditch berms with approved herbicides;

WHEREAS, Landowner desires that the sides and tops of the canal and ditch berms on or adjacent to the Premises NOT be sprayed with herbicide;

NOW, THEREFORE, for consideration the receipt and sufficiency which is hereby stipulated, NID and Landowner (collectively hereinafter "Parties") agree as follows:

SI:\AM\NID\No Spray Agreement\NID NO SPRAY Agt.spd

-1-

Algae Management

Algae

- Algaecides



Before GreenClean



After GreenClean

Algae Management



OMRI Listed®

The following product is OMRI Listed. It may be used in certified organic production or food processing and handling according to the USDA National Organic Program Rule.

Product

GreenClean®PRO Broad Spectrum Algaecide/Fungicide/Bactericide Oxidizer

Company

BioSafe Systems
Lauren Crane
22 Meadow St
East Hartford, CT 06108

Status

Allowed with Restrictions

Category

NOP: Sodium Carbonate Peroxyhydrate

Issue date

30-Nov-2010

Product number

bss-2281

Class

Crop Pest, Weed, and Disease Control

Expiration date

01-Dec-2017

Restrictions

Federal law restricts the use of this substance in food crop production to approved food uses identified on the product label. May only be used as a pesticide if the requirements of 205.206(e) are met, which requires the use of preventative, mechanical, physical, and other pest, weed, and disease management practices.

Peggy Mians

Executive Director

Product review is conducted according to the policies in the current *OMRI Policy Manual*® and based on the standards in the current *OMRI Standards Manual*®. To verify the current status of this or any OMRI Listed product, view the most current version of the *OMRI Products List*® at OMRI.org. OMRI listing is not equivalent to organic certification and is not a product endorsement. It cannot be construed as such. Final decisions on the acceptability of a product for use in a certified organic system are the responsibility of a USDA accredited certification agent. It is the operator's responsibility to properly use the product, including following any restrictions.



Organic Materials Review Institute
P.O. Box 11558, Eugene, OR 97440-3758, USA
541.343.7600 • fax 541.343.8971 • info@omri.org • www.omri.org

The background features a warm, orange-toned scene. In the upper left, several leaves are shown with water droplets on their surfaces. Below them, a series of concentric ripples emanate from a central point on a liquid surface, suggesting a recent drop. The overall aesthetic is clean and natural, emphasizing water and its interaction with organic matter.

Chemical Controls

☞ Chemical Controls ☞

Methods

NID's methods include:

- Herbicides – Terrestrial Weeds
- Herbicides – Aquatic Weeds
- Algaecides – Algae

☞ Chemical Controls ☜

Consultants and Resources

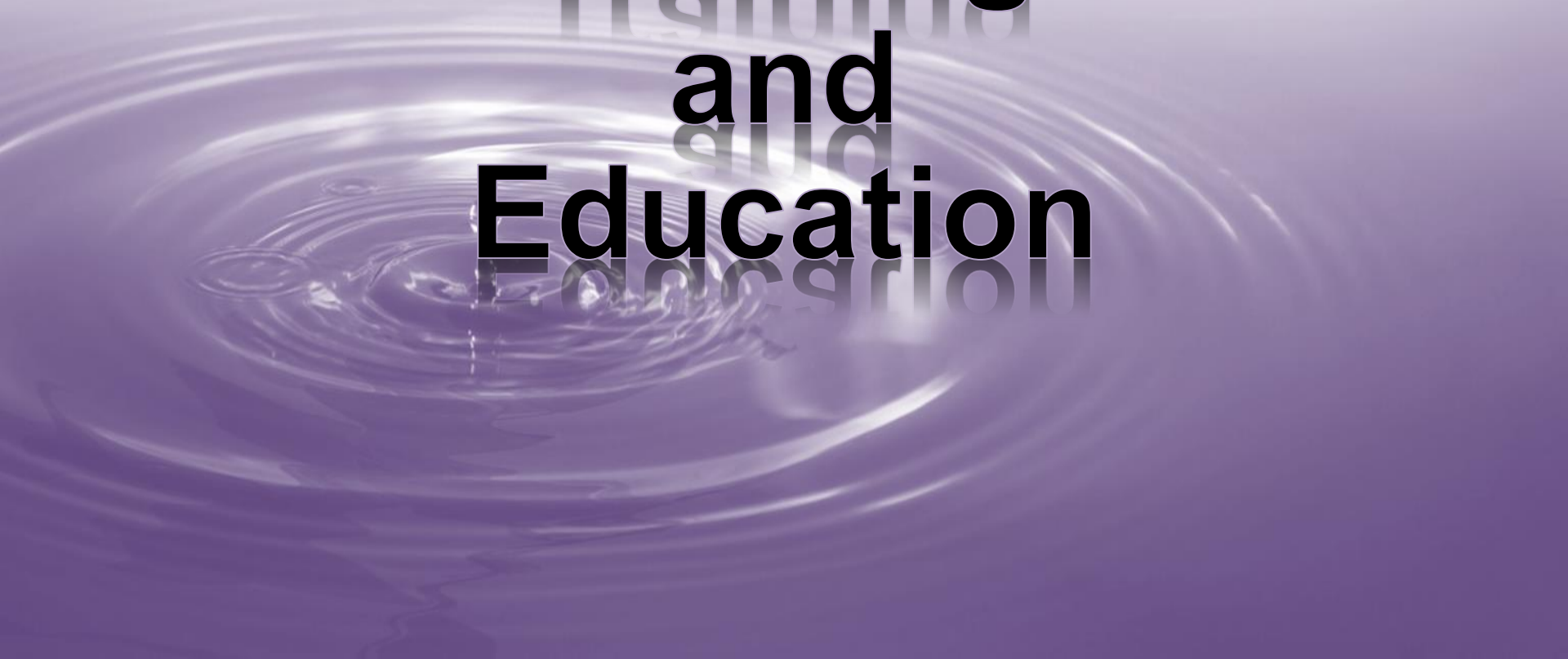


Resources





Training and Education



☞ Training and Education ☜

Licenses / Certifications

- ❑ Pest Control Advisor License
 - Requires B.S. degree, with 12 semester units of agriculture and science classes
 - Exam administered by DPR
 - License renewal every 2 years, with 40 hours of continuing education

- ❑ Qualified Applicator License or Certificate
 - Exam administered by DPR
 - License or certificate renewal every 2 years, with 20 hours of continuing education

☞ Training and Education ☜

Continuing Education

- ❑ DPR determines what qualifies as continuing education units (CEU's)
- ❑ Prior to event, content is presented to DPR for evaluation and assignment of CEU's
- ❑ Classes/seminars are sponsored by professional organizations, such as ...



- ❑ NID also supplements continuing education with in-house training twice a year

The background is a light teal color with a gradient. In the upper left corner, there are several green leaves with water droplets on them. In the center, there are concentric ripples on a body of water, suggesting a drop has just fallen. The text is centered over the ripples.

Regulatory and Inspections

☞ Regulatory and Inspections ☞

Regulatory Agencies

- ❑ California Environmental Protection Agency
- ❑ California Department of Pesticide Regulation
- ❑ California Department of Fish and Wildlife
(annual)
- ❑ California State Water Board
(annual)
- ❑ Federal Environmental Protection Agency

☞ Regulatory and Inspections ☞

Reporting Agencies

- Nevada County Agriculture Commissioner
(annual/monthly)
- Placer County Agriculture Commissioner
(annual/monthly)
- Yuba County Agriculture Commissioner
(annual/monthly)
- County Department of Health and Safety

☞ Regulatory and Inspections ☞

Law and Regulations

- California Environmental Quality Act
(CEQA)
- National Environmental Protection Act
(NEPA)
- Endangered Species Act
(ESA)
- Clean Water Act
(CWA)

☞ Regulatory and Inspections ☜

Licensing and Permits

- Pest Control Advisor License
(biennial)
- Qualified Applicator License or Certificate
(biennial)
- DMV HazMat Endorsement
(renew every 5 years)
- Restricted Materials Permit
(annual)
- National Pollution Discharge Elimination System (NPDES) Permit
(annual plus renew every 5 years)

⌘ Regulatory and Inspections ⌘

Monitoring and Reporting

- NPDES
 - Water Quality Monitoring
 - Biological Monitoring
 - Beneficial Use Certification
 - Notice of Intent

- County Agriculture Commissioners
 - Monthly Pesticide Use Reports
 - Notice of Intent

⌘ Regulatory and Inspections ⌘

Monitoring and Reporting

□ NPDES





Costs



Costs

Cost Comparison of Methods

Summary Page for Vegetation Control

	<u>\$/s.f.</u>
Vegetation Management (Aquatic only)	\$ 0.02
Vegetation Management (Terrestrial only)	\$ 0.04
Vegetation Management (includes Aquatic and Terrestrial)	\$ 0.06
Goats	\$ 0.15
Steam Machine	\$ 0.36
Hand / Machine Cleaning	\$ 0.40

Costs

Various Treatment Types (Terrestrial only)

<u>Treatment / Labor</u>	<u>\$/acre</u>	<u>\$/hour</u>	<u>acre (#)</u>	<u>time (hr)</u>	<u>Total</u>	
Estimated Costs for Herbicides (Terrestrial Control)						
Roundup w/Surfactant	\$ 8.99		4.0		\$ 35.96	
Utility Worker		\$40.48		10.0	\$ 404.80	
Utility Worker		\$40.48		10.0	\$ 404.80	
Side-by-Side and Sprayer Unit		\$35.00		10.0	\$ 350.00	
Truck and Trailer		\$25.00		10.0	\$ 250.00	
Sub Total for 4.0 acres:					\$ 1,445.56	÷ 4.0 = \$ 361.39 per acre -or- \$ 0.0083 per sf
Payload w/Anti-Drift	\$ 57.25		4.0		\$ 229.00	
Utility Worker		\$40.48		10.0	\$ 404.80	
Utility Worker		\$40.48		10.0	\$ 404.80	
Side-by-Side and Sprayer Unit		\$35.00		10.0	\$ 350.00	
Truck and Trailer		\$25.00		10.0	\$ 250.00	
Sub Total for 4.0 acres:					\$ 1,638.60	÷ 4.0 = \$ 409.65 per acre -or- \$ 0.0094 per sf
Gallery / Dimension w/Anti-Drift	\$ 216.76		4.0		\$ 867.04	
Utility Worker		\$40.48		10.0	\$ 404.80	
Utility Worker		\$40.48		10.0	\$ 404.80	
Side-by-Side and Sprayer Unit		\$35.00		10.0	\$ 350.00	
Truck and Trailer		\$25.00		10.0	\$ 250.00	
Sub Total for 4.0 acres:					\$ 2,276.64	÷ 4.0 = \$ 569.16 per acre -or- \$ 0.0131 per sf

Costs

Estimated Cost of Vegetation Management Using Chemicals (Aquatic only)

<u>Annual Vegetation Crew Expenses</u>				
<u>Personnel</u>	<u>\$/hour</u>	<u>Time (hr)</u>	<u>Subtotal</u>	<u>Total</u>
Assistant Maintenance Suprintendent	\$ 70.81	700.0	\$ 49,567.00	
Senior Utility Worker	\$ 52.22	700.0	\$ 36,554.00	
Utility Worker	\$ 40.48	700.0	\$ 28,336.00	
Utility Worker	\$ 40.48	700.0	\$ 28,336.00	
Utility Worker	\$ 40.48	700.0	\$ 28,336.00	
Utility Worker	\$ 40.48	700.0	\$ 28,336.00	
			\$ 199,465.00	\$ 199,465.00
<u>Equipment</u>	<u>\$/hour</u>	<u>Time (hr)</u>	<u>Subtotal</u>	
Side-by-Side and Sprayer Unit	\$ 35.00	700.0	\$ 24,500.00	
Side-by-Side and Sprayer Unit	\$ 35.00	700.0	\$ 24,500.00	
Pickup Truck and Trailer	\$ 25.00	700.0	\$ 17,500.00	
Pickup Truck and Trailer	\$ 25.00	700.0	\$ 17,500.00	
			\$ 84,000.00	\$ 84,000.00
Annual Herbicide Costs (Aquatic only)			\$ 140,000.00	
			\$ 140,000.00	\$ 140,000.00
				\$ 423,465.00
<u>Total Costs</u>				
Total <u>miles</u> of canal system treated			340	
Total <u>linear feet</u> of canal system treated			1,795,200	1,795,200
<u>Cost for Vegetation Management Using Herbicides per linear foot of canal (\$/lf)</u>				\$ 0.24
<u>Cost for Vegetation Management Using Herbicides per square foot of 10-foot wide berm (\$/sf)</u>				\$ 0.02

(Note: Labor rate is salary and benefits, no overhead. Hours listed are for Aquatic work only.)

Costs

Estimated Cost of Vegetation Management Using Chemicals (Terrestrial only)

<u>Annual Vegetation Crew Expenses</u>				
<u>Personnel</u>	<u>\$/hour</u>	<u>Time (hr)</u>	<u>Subtotal</u>	<u>Total</u>
Assistant Maintenance Superintendent	\$ 70.81	1380.0	\$ 97,717.80	
Senior Utility Worker	\$ 52.22	1380.0	\$ 72,063.60	
Utility Worker	\$ 40.48	1380.0	\$ 55,862.40	
Utility Worker	\$ 40.48	1380.0	\$ 55,862.40	
Utility Worker	\$ 40.48	1380.0	\$ 55,862.40	
Utility Worker	\$ 40.48	1380.0	\$ 55,862.40	
			\$ 393,231.00	\$ 393,231.00
<u>Equipment</u>	<u>\$/hour</u>	<u>Time (hr)</u>	<u>Subtotal</u>	
Side-by-Side and Sprayer Unit	\$ 35.00	1380.0	\$ 48,300.00	
Side-by-Side and Sprayer Unit	\$ 35.00	1380.0	\$ 48,300.00	
Pickup Truck and Trailer	\$ 25.00	1380.0	\$ 34,500.00	
Pickup Truck and Trailer	\$ 25.00	1380.0	\$ 34,500.00	
			\$ 165,600.00	\$ 165,600.00
Annual Herbicide Costs (Terrestrial only)			\$ 80,000.00	
Annual Monitoring, Permit and Training Costs			\$ 10,000.00	
			\$ 90,000.00	\$ 90,000.00
				\$ 648,831.00
<u>Total Costs</u>				
Total <u>miles</u> of canal system treated			340	
Total <u>linear feet</u> of canal system treated			1,795,200	1,795,200
<u>Cost for Vegetation Management Using Herbicides per linear foot of canal (\$/lf)</u>				\$ 0.36
<u>Cost for Vegetation Management Using Herbicides per square foot of 10-foot wide berm (\$/sf)</u>				\$ 0.04

(Note: Labor rate is salary and benefits, no overhead. Hours listed are for Terrestrial work only.)

Costs

Estimated Cost of Vegetation Management Using Chemicals (Terrestrial and Aquatic)

<u>Annual Vegetation Crew Expenses</u>				
<u>Personnel</u>	<u>\$/hour</u>	<u>Time (hr)</u>	<u>Subtotal</u>	<u>Total</u>
Assistant Maintenance Suprintendent	\$ 70.81	2080.0	\$ 147,284.80	
Senior Utility Worker	\$ 52.22	2080.0	\$ 108,617.60	
Utility Worker	\$ 40.48	2080.0	\$ 84,198.40	
Utility Worker	\$ 40.48	2080.0	\$ 84,198.40	
Utility Worker	\$ 40.48	2080.0	\$ 84,198.40	
Utility Worker	\$ 40.48	2080.0	\$ 84,198.40	
			\$ 592,696.00	\$ 592,696.00
<u>Equipment</u>	<u>\$/hour</u>	<u>Time (hr)</u>	<u>Subtotal</u>	
Side-by-Side and Sprayer Unit	\$ 35.00	2080.0	\$ 72,800.00	
Side-by-Side and Sprayer Unit	\$ 35.00	2080.0	\$ 72,800.00	
Pickup Truck and Trailer	\$ 25.00	2080.0	\$ 52,000.00	
Pickup Truck and Trailer	\$ 25.00	2080.0	\$ 52,000.00	
			\$ 249,600.00	\$ 249,600.00
Annual Herbicide Costs			\$ 220,000.00	
Annual Monitoring, Permit and Training Costs			\$ 10,000.00	
			\$ 230,000.00	\$ 230,000.00
				\$ 1,072,296.00
<u>Total Costs</u>				
Total <u>miles</u> of canal system treated			340	
Total <u>linear feet</u> of canal system treated			1,795,200	1,795,200
<u>Cost for Vegetation Management Using Herbicides per linear foot of canal (\$/lf)</u>				\$ 0.60
<u>Cost for Vegetation Management Using Herbicides per square foot of 10-foot wide berm (\$/sf)</u>				\$ 0.06

(Note: Labor rate is salary and benefits, no overhead.)

Costs

Grazing

Cost varies depending on number of acres, type of terrain, whether additional fencing is needed to contain goats, etc., and can range between \$0.02 and \$0.20 per s.f.

Estimated cost to graze goats along the canal berm is \$0.15 per s.f.



Costs

Steam Treatment (Terrestrial only)

Treatment / Labor	\$/acre	\$/hour	acre (#)	time (hr)	Total
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Estimated Costs for Alternate Methods for Vegetation Control (Terrestrial Control)

Treatment / Labor	\$/acre	\$/hour	acre (#)	time (hr)	Total
Steam					
Propane					\$ 90.00
Utility Worker		\$40.48		10.0	\$ 404.80
Utility Worker		\$40.48		10.0	\$ 404.80
Kubota Tractor and Steam Unit		\$80.00		10.0	\$ 800.00
Truck and Trailer		\$25.00		10.0	\$ 250.00
Sub Total for 1/8 of an acre:					\$ 1,949.60
					x 8.0 = \$ 15,596.80 per acre -or-
					\$ 0.3581 per sf



Costs

Clean 1,000 l.f. Section of Untreated Canal (hybrid cost comparison)

Hybrid Cost Comparison using Excavator, Goats and/or Suppress Herbicide

Excavator Usage - Wide Berm with Equipment Accessibility (Machine Cleaning)

Labor Cost for District Crews to Clean Canal for Cost Comparison

Personnel	\$/hour	Time (hr)	Subtotal	Total
Operator	\$ 49.91	6.0	\$ 299.46	
Truck Driver	\$ 49.91	6.0	\$ 299.46	
Utility Worker	\$ 40.48	6.0	\$ 242.88	
Utility Worker	\$ 40.48	6.0	\$ 242.88	
			\$ 1,084.68	\$ 1,084.68

Equipment	\$/hour	Time (hr)	Subtotal	Total
Excavator	\$ 75.00	6.0	\$ 450.00	
5-yd Dump Truck	\$ 30.00	6.0	\$ 180.00	
Pickup Truck	\$ 20.00	6.0	\$ 120.00	
Pickup Truck	\$ 20.00	6.0	\$ 120.00	
			\$ 870.00	\$ 870.00
				\$ 1,954.68

Goat Herd on Berm Side

Goat Costs along berm (estimated from a local herder) at \$0.15 per sf

Canal length of 1,000 linear feet at 10 ft wide = 10,000 sf

Therefore, costs for goats on berm = 10,000 * \$0.15 = \$1,500

\$ 1,500.00

Herbicide use on Berm Side

Estimated Costs for Suppress Herbicide (Terrestrial Control)

Suppress herbicide costs \$70 per gallon - approximately 4.5 gallon for 1 acre = \$315

Minimum of three applications needed through Summer season = \$315 * 3 = \$945 for 1 acre

Total berm area: 1,000 lf * 10 ft = 10,000 sf = 0.23 ac

One full 10 hr day to apply herbicide to 4 acres

Treatment / Labor	\$/acre	\$/hour	acre (#)	time (hr)	Total	
Suppress	\$ 945.00		4.0		\$ 3,780.00	
Utility Worker		\$ 40.48		10.0	\$ 404.80	
Utility Worker		\$ 40.48		10.0	\$ 404.80	
Side-by-Side and Sprayer Unit		\$ 35.00		10.0	\$ 350.00	
Truck and Trailer		\$ 25.00		10.0	\$ 250.00	
Sub Total for 4.0 acres:					\$ 5,189.60	/4
					\$ 1,297.40	per acre
					\$ 298.40	per 1,000 ft sect or 0.23 acre

Cost to machine clean a 1,000 linear foot section of canal (aquatics) and use goats or Suppress on berm side

Goats **\$ 3,454.68** Suppress **\$ 2,253.08**

Cleaning cost per linear foot of canal (\$/lf)

\$ 3.45 **\$ 2.25**

Cleaning cost per square foot of 10-foot wide berm (\$/sf)

\$ 0.35 **\$ 0.23**

(Note: Labor rate is salary and benefits, no overhead.)

Costs

Clean 1,000 l.f. Section of Untreated Canal

Labor Cost for District Crews to Clean Canal for Cost Comparison

Wide Berm with Equipment Accessibility (Machine Cleaning)

<u>Personnel</u>	<u>\$/hour</u>	<u>Time (hr)</u>	<u>Subtotal</u>	<u>Total</u>
Operator	\$ 49.91	6.0	\$ 299.46	
Truck Driver	\$ 49.91	6.0	\$ 299.46	
Utility Worker	\$ 40.48	6.0	\$ 242.88	
Utility Worker	\$ 40.48	6.0	\$ 242.88	
			\$ 1,084.68	\$ 1,084.68

<u>Equipment</u>	<u>\$/hour</u>	<u>Time (hr)</u>	<u>Subtotal</u>	<u>Total</u>
Excavator	\$ 75.00	6.0	\$ 450.00	
5-yd Dump Truck	\$ 30.00	6.0	\$ 180.00	
Pickup Truck	\$ 20.00	6.0	\$ 120.00	
Pickup Truck	\$ 20.00	6.0	\$ 120.00	
			\$ 870.00	\$ 870.00
				\$ 1,954.68

Narrow Berm with No Equipment Accessibility (Hand Cleaning)

<u>Personnel</u>	<u>\$/hour</u>	<u>Time (hr)</u>	<u>Subtotal</u>	<u>Total</u>
Supervisor	\$ 60.94	24.0	\$ 1,462.56	
Utility Worker	\$ 40.48	24.0	\$ 971.52	
Utility Worker	\$ 40.48	24.0	\$ 971.52	
Utility Worker	\$ 40.48	24.0	\$ 971.52	
Utility Worker	\$ 40.48	24.0	\$ 971.52	
			\$ 5,348.64	\$ 5,348.64

<u>Equipment</u>	<u>\$/hour</u>	<u>Time (hr)</u>	<u>Subtotal</u>	<u>Total</u>
Backhoe	\$ 75.00	24.0	\$ 1,800.00	
5-yd Dump Truck	\$ 30.00	24.0	\$ 720.00	
Pickup Truck	\$ 20.00	24.0	\$ 480.00	
Pickup Truck	\$ 20.00	24.0	\$ 480.00	
			\$ 3,480.00	\$ 3,480.00
				\$ 8,828.64

Average cost to machine and hand clean a 1,000 linear foot section of canal (weighted average at 70% machine and 30% hand cleaning) **\$ 4,016.87**

Cleaning cost per linear foot of canal (\$/lf) **\$ 4.02**
 Cleaning cost per square foot of 10-foot wide berm (\$/sf) **\$ 0.40**

(Note: Labor rate is salary and benefits, no overhead.)

Costs

Cost Comparison of Methods

Summary Page for Vegetation Control

	<u>\$/s.f.</u>
Vegetation Management (Aquatic only)	\$ 0.02
Vegetation Management (Terrestrial only)	\$ 0.04
Vegetation Management (includes Aquatic and Terrestrial)	\$ 0.06
Goats	\$ 0.15
Steam Machine	\$ 0.36
Hand / Machine Cleaning	\$ 0.40



Thank You

