

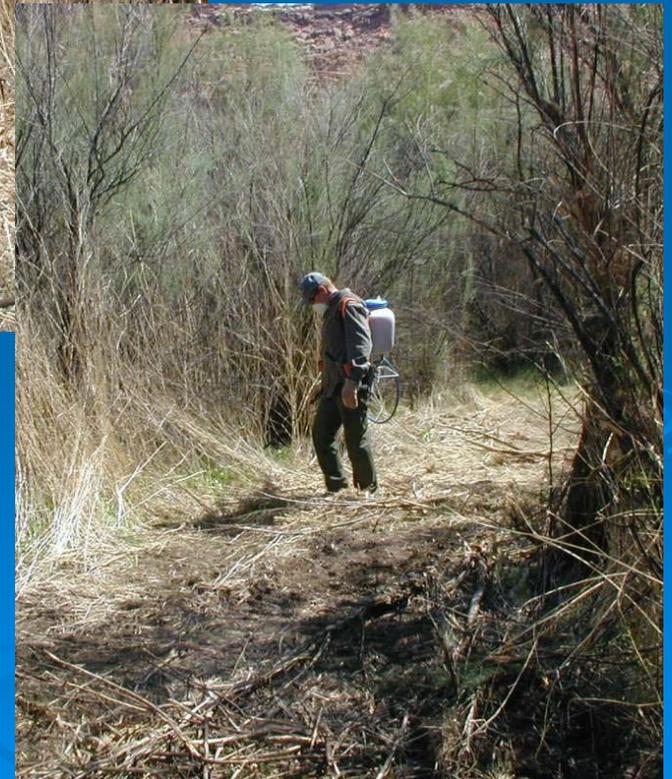
Tamarisk-

An overview of Grand County's biological control program

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Traditional Methods of Removal



The Early Years

- Jack DeLoach spoke at a biological control workshop in Price, Utah
 - (Invited by Grand, Emery, & Carbon County Agents)
- Discussed his work with *Diorhabda elongata*, Tamarisk/Salt Cedar Leaf Beetle
- Suggested during that talk he felt the beetles could control 70-85% of tamarisk given time.

Tamarisk Leaf Beetle

- Original Sources:
 - Northwestern China (Fukang & Turpan);
 - southeastern Kazakhstan (Chilik);
 - Greece (Crete);
 - Tunisia and Uzbekistan.
- One generation requires about 40 Days @ (24°C / 75.2°F)
- Adult emerge mid-April to mid-May
- 2 to 4 generations depending on biotype

Tamarisk Leaf Beetle

Eggs

- Eggs tan, spherical, laid singly or in masses up to 25 (avg. 3 to 10) on young foliage or small stems
- Females lay between 100-200 eggs
- Eggs hatch in 5 to 6 days

Eggs



Tamarisk Leaf Beetle

Larva

- Development requires about 22 days
- 3 instars (immature stages of an insect)
- Larvae are black
 - Second instar up to 4 mm w yellowish mid-lateral spots
 - Third instar up to 9 mm w conspicuous mid-lateral yellow stripe
- Larvae crawl or drop to ground, pupate under litter or loose soil, 1-2 cm below surface
- Prepare cocoons of litter, soil, silk (combo)

Larva



Tamarisk Leaf Beetle Pupae & Adult

➤ Pupae

- Develop in about 7 days, bright yellow

➤ Adults

- Males 5.6 mm – females 5.9 mm
- Yellowish bodies, w dark brown stripes (chinese/Kazakhstan)
 - indistinct stripes other biotypes
- Live 15-20 days

Larva & Beetle



Tamarisk Beetle

- Destructive stages – Larval and adult
 - Feed on foliage, can scrape bark off small twigs
- Adults of Kazakhstan/China biotypes
 - Require 15 hrs + daylight to avoid entering winter diapause.
 - If enter early usually fail to overwinter
 - Diapause- “sleep-time”, often entered due to shorter days, cooler temps, etc. (if insect is a long- day insect)
- Stages to transfer: Adult, large larval (3rd instar), egg
- Other plant concerns:
 - Tree athel (tamarix aphylla)
 - Frankenia – johnstonii, jamesii, salina.

The Early Years (cont)

- In 1998 Jack considered Delta, Moab and another site in Utah as possible release sites.
- Concerns over Southwestern Willow Fly Catcher eliminated Moab as a site at that time.
- Delta, Utah became release site

Early Years

- 1999-2000 releases into field cages took place at 10 sites in California, Colorado, Nevada, Texas, Utah, & Wyoming.
- In 2001 beetles released into open field at 7 of these sites.

Field Cages – Delta, UT



2004

- The Delta site opened for capture and movement of tamarisk leaf beetles/larva to other areas of Utah.
 - Only to approved sites: state & private lands
- Grand & Carbon/Emery groups (in August) were the first to capture beetles and larva.
 - Grand County collected on August 3, 2004

Delta 2004



Capture 2004



Releases 2004

- Released beetles & larva at 2 sites (8/3/04)
 - Jackson Bottom (#1 site)
 - Williams Bottom (#2)
- Possibly 10,000 each site (?)
- Collected again in Delta (8/18/04)
- Released sites #1 & 2 & Cottonwood Bend Ranch (site #3)
 - Approximately same numbers

Release In Grand – Site #1



Release – Site #2



Capture & Release 2005

- Collected 3 times from Delta
 - 2x - July & 1x - September.
- 1st collection (July) released at original three sites
- 2nd (July), released at 3 new sites (secondary sites)
 - private property Green River
 - business property in Moab
 - private property past Castle Valley
- 3rd (Sept), released again at 3 secondary sites

Beetle Activity 2005

- September:
 - #1 site had 2+ acres defoliated
 - #2 site had about 50' area defoliated
- Beetles entered overwintering diapause @ end of Sept.
 - Diapause- “sleep-time”, often done due to shorter days, cooler temps, etc. (if insect is a long- day insect)
- Tamarisk had about 30 days to re-foliate after insects entered diapause.
 - Plants that had been totally defoliated - re-foliated up to 50-70%.

Potash Site (#1)

10/7/05



Tamarisk Plants

Site #1

10/7/05



Spring/Early Summer 2006

- April 22 – beetles found within 100 ft of 1st release site
- April 29 – beetles found within 50 ft of 2nd release site
- May 25 – larva, eggs, adults found all sites except Green River
- June 6 – Potash site (#1) had approx 14 acres defoliated
- June 12 – Cottonwood Bend site spreading
- June 15 – Potash site approx 1 mile in length along road, approx 20+ acres; Williams Bottom (#2) about 1/2-1 acre.

Potash Site (#1)

June 2006



Williams Bottom (#2) - June 2006



Summer 2006

- June 23 - Moved 2000 larva site #1 to secondary sites (first movement within county)**
- July 5 – Site #1 - 2.7 mile stretch defoliated
- July 11 – beetle activity seen across river
- July 13 – Site #1 - 5+ mile stretch
- August 9 – activity found 6 miles up river from site #1 and 11 miles down river
 - (by 8/14, 11 miles, linked, totally defoliated).
- August 14 – Site #1 & 2 appear to have converged-activity seen (8 miles difference)
- Cottonwood Bend site has spread over 6 miles up/down river.

Down River Site #1

7/13/06



Williams Bottom August 2006



Aerial Photo – 8/2006

Down river site #1



Aerial Photo - 8/06

Site #1



Aerial Photo – 8/06

Site #1



Aerial Photo – 8/06

2005 Secondary Release Site (2x)



Aerial Photo – 8/06

Downriver Cottonwood Bend Site



Capture & Releases

- Total of 10 sites with releases
- 2 to 3 releases per site
- All new movements will be done “in county”
(collecting and moving)

Tamarisk & Natives



Tamarisk & Natives



Tamarisk & Natives



Tamarisk & Recreation



The End

