



BEMP Vegetation 2015

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UNM Herbarium

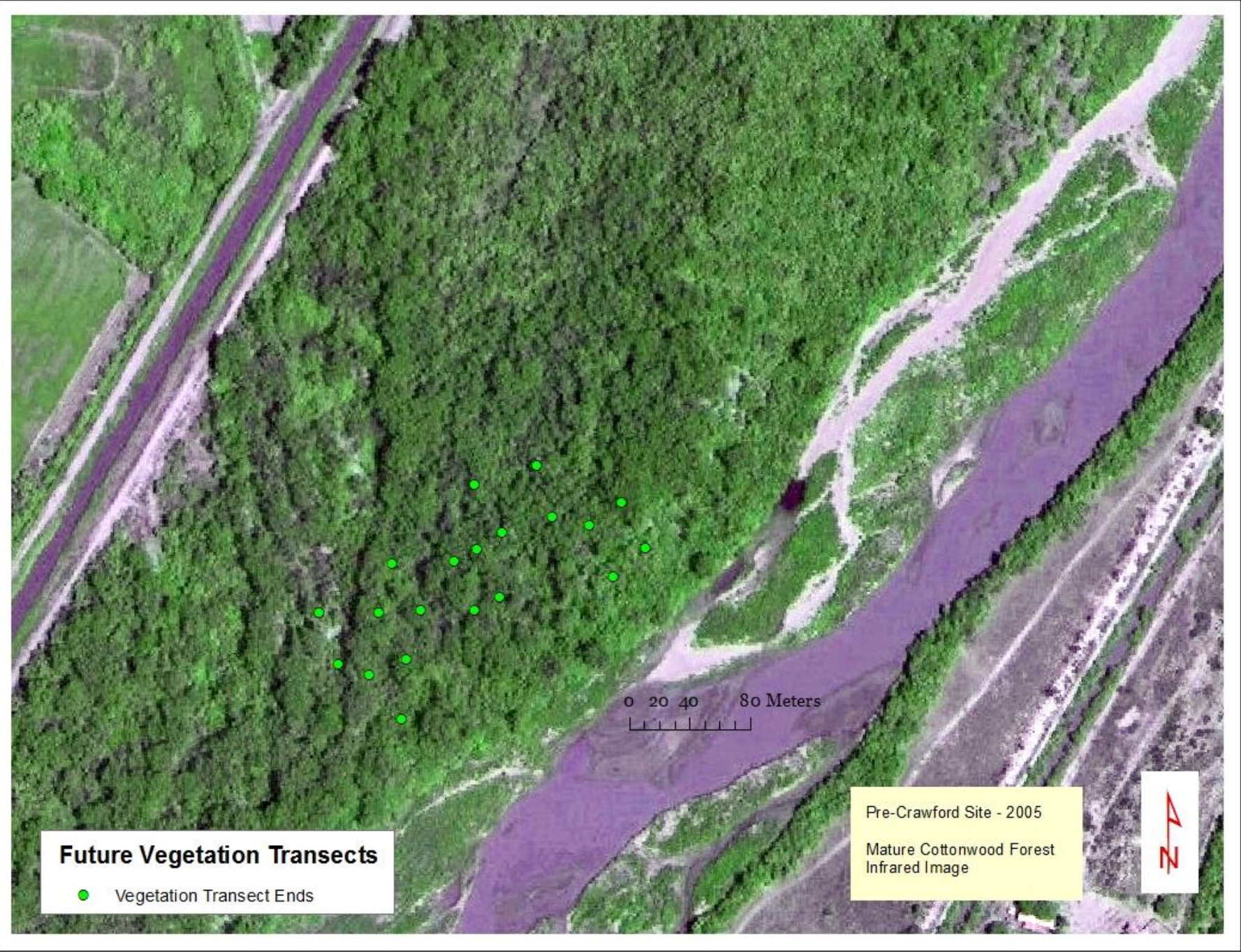
Museum of Southwestern Biology

University of New Mexico

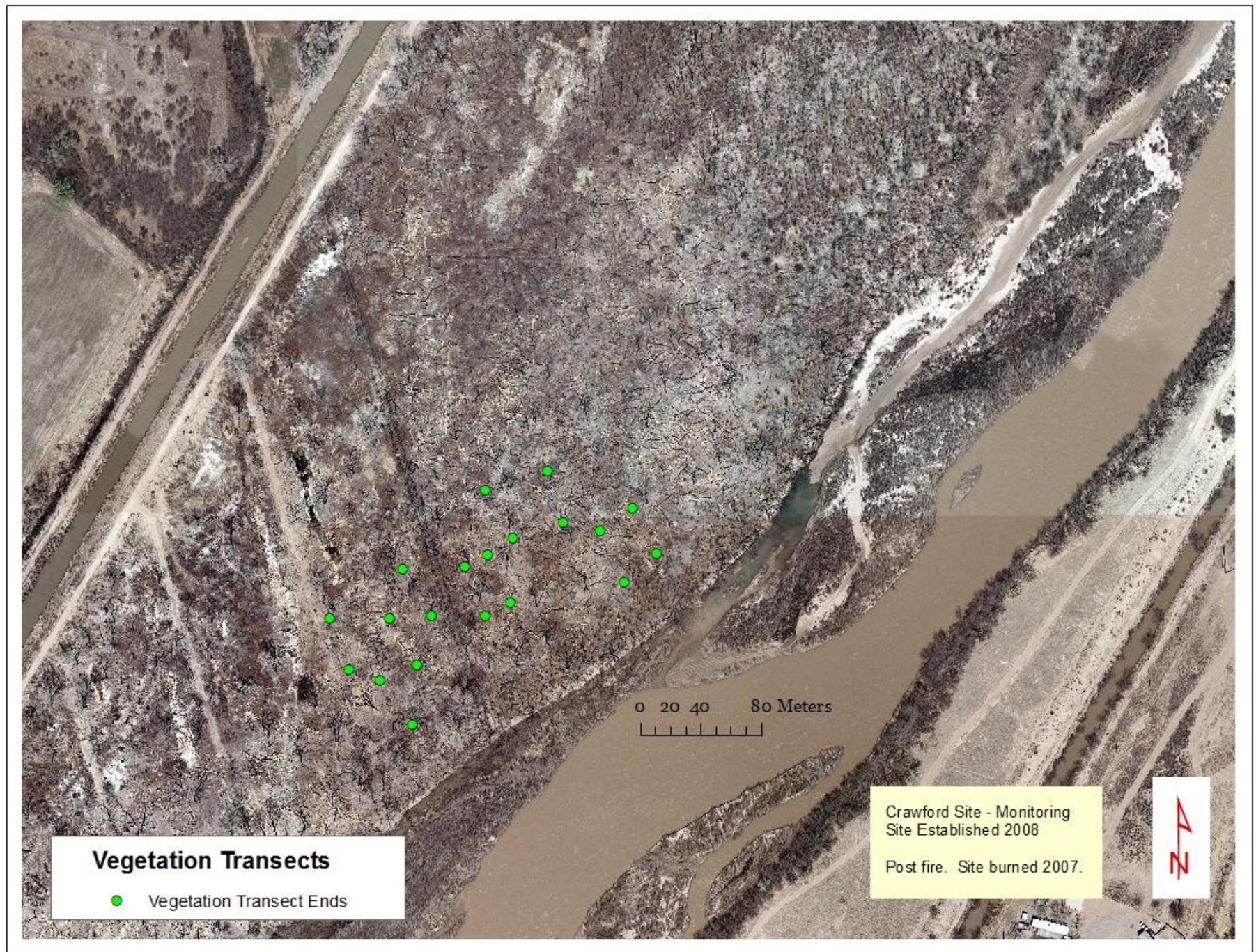
Every year the vegetation crew gives a brief update, noting changes that were observable during field work conducted for the Bosque Ecosystem Monitoring Program. We generally note relatively short-term trends in the bosque. This year we've decided to take a visual look at some of the major changes that have taken place over time at a few sites visually examining the role of fire, flooding and restoration efforts. There is good imagery available for the river over time but it varies quite a bit from color to black and white or infrared imagery. There are obvious color changes from image to image but our focus is to look at what's happened to the form of the bosque, most notably, changes in the cottonwood canopy.

Before the BEMP program installed the Crawford site in Belen there was a mature cottonwood forest as can be seen in Map 1. In 2007 a fire killed the above-ground portion of the cottonwoods as can be seen in the 2008 image of the site, Map 2. In 2009 the northern portion of the BEMP site was modified to allow overbank flooding of the Rio Grande into the river terrace at flow volumes of 2,500 cfs. The area was excavated and lowered 2-4 feet by the Interstate Stream Commission so that periodic flooding would encourage revegetation of the area. In the time since the lowering there's been much competition among plant species to establish within this area. The BEMP program has monitored the major changes as well as dynamic and subtle changes in vegetation that have taken place within this restoration area. There have been times that the salt cedar cover appeared greater than the cottonwood regeneration and a bit of back and forth over time in cover values of these species. At present, there is a relatively healthy cottonwood and willow component recolonizing the lowered area.

Map 1. Crawford Location before the BEMP monitoring site was established. Infrared image.



Map 2. Crawford Site, 2008. Canopy removed by fire in 2007.



Map 3. Crawford Site, 2009. Northern vegetation transects re-established following lowering of the site by the Interstate Stream Commission.

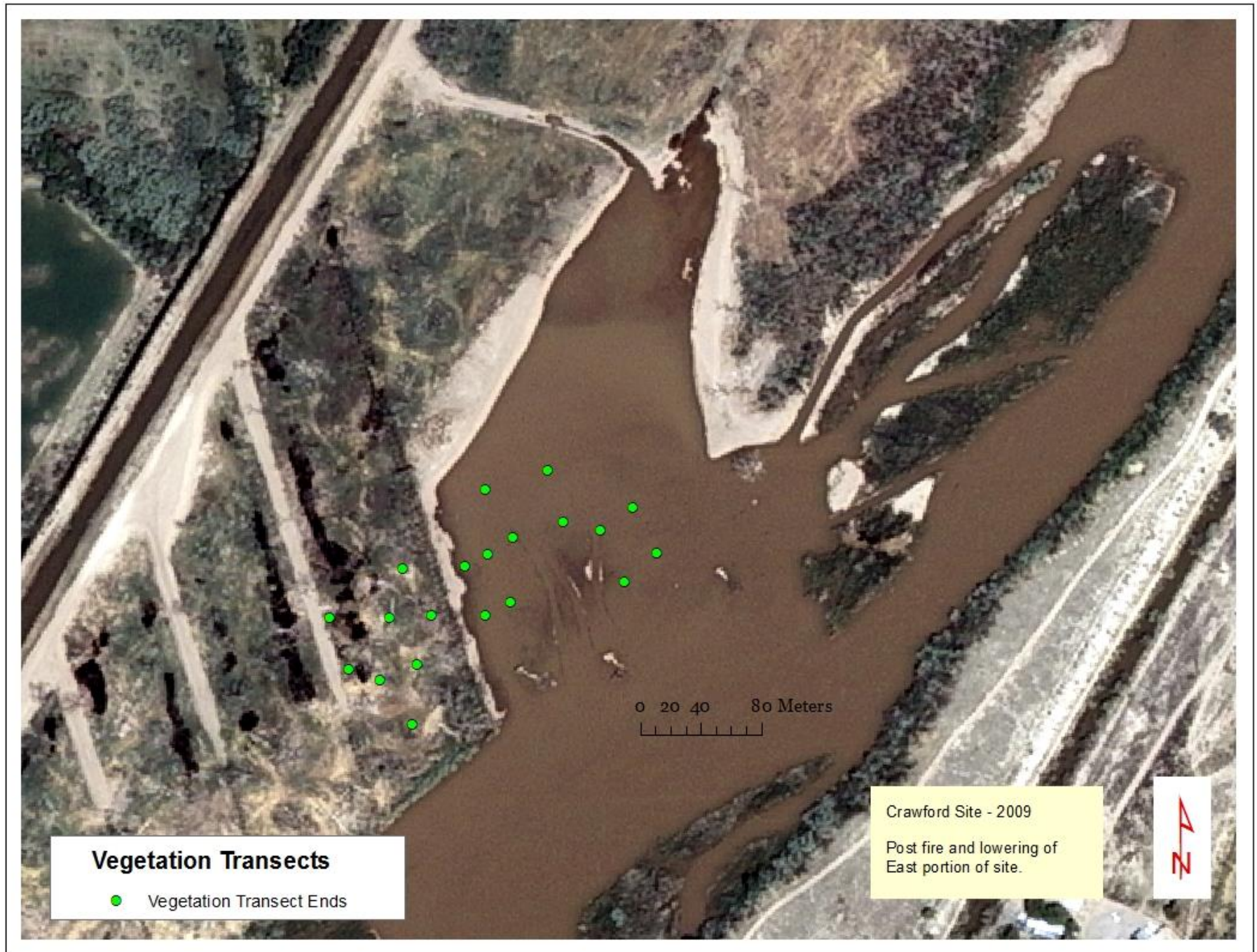




Photo 1. Crawford Site, 2015, showing young cottonwood cover in the lowered portion of the site.



Photo 2. Crawford Site, 2015. Salt Cedar is still within and near the site, shown here after defoliation by the salt-cedar leaf beetle.

The Ohkay Owingeh site was established in San Juan Pueblo in 2002; map 4. After baseline ecological data was collected the site burned in June of 2003, and again in April 2010. The cottonwoods did not die as quickly as they did at the Crawford site. Many of the large trees survived initially but eventually died here. This year there is only one large tree remaining and it likely will not last much longer; map 5. At this site and in many places along the river we've documented the decline of mature cottonwood forests and the progressive changes in plant community structure that follow disturbances such as fire, fuel reduction, mowing, herbicide application, mechanical control of exotic trees, and dropping water tables.

Map 4, Ohkay Owingeh, 2002.

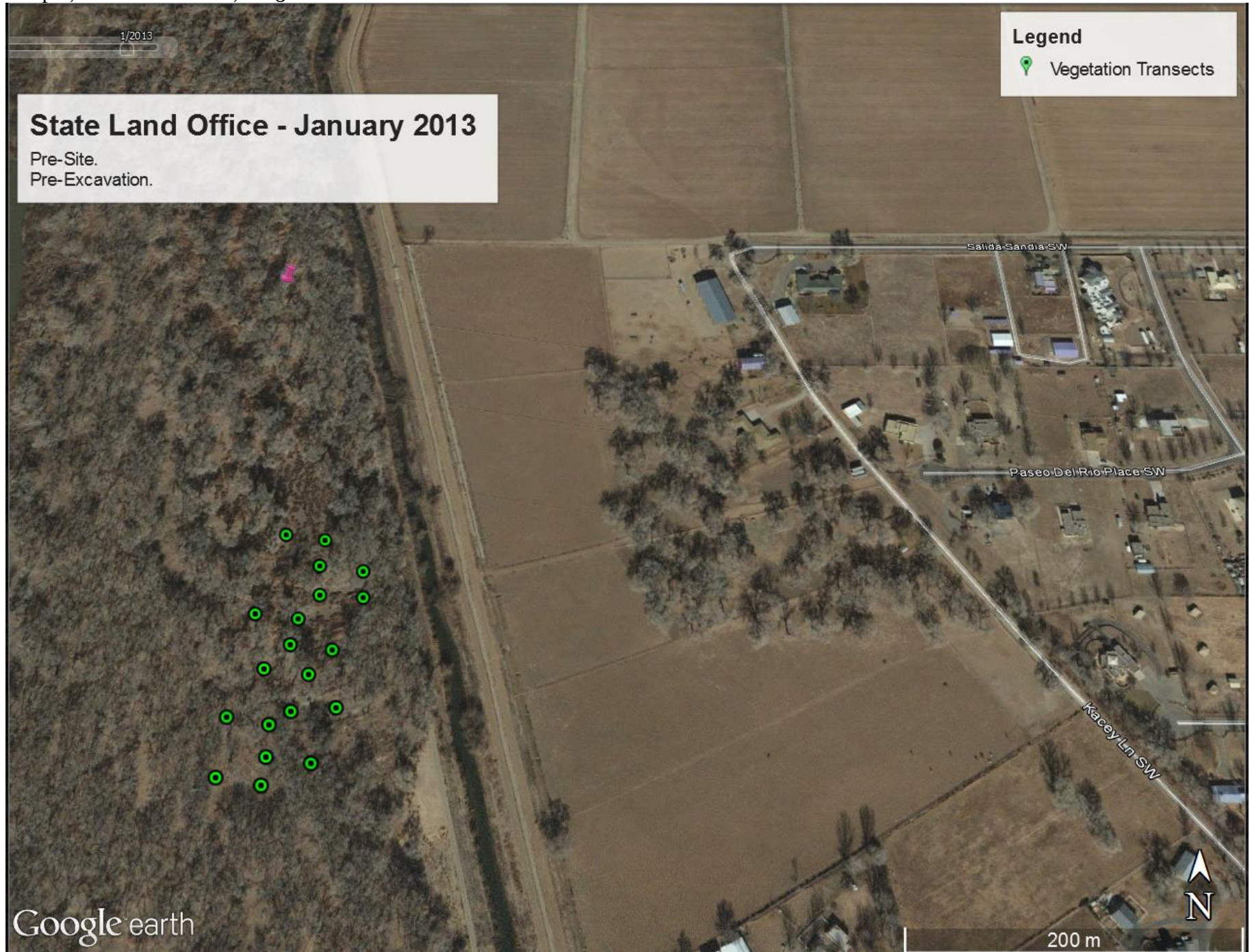


Map 5, Ohkay Owingeh, 2015.



The State Land Office (SLO) BEMP site was established in 2014. From its original condition in 2014, map 6, SLO is a quickly changing site because of the deep-cut channels that were put in place for wetland creation. When we first monitored this site there wasn't much in the channels, but now they are becoming very lush with vegetation. After the pond and channel excavation, map 7, the area was seeded with an upland seed mix that didn't reflect the bosque plant community. While some of these seeded plants persist along bike paths in the bosque it is unknown what will happen to these introduced species over time at the SLO site. As the wetland plant diversity and cover increases there is likely an overall increase in plant and animal species diversity at this site as it forms a habitat quite changed from what was there only a few years ago; photo 3.

Map 6, State Land Office, 2013.



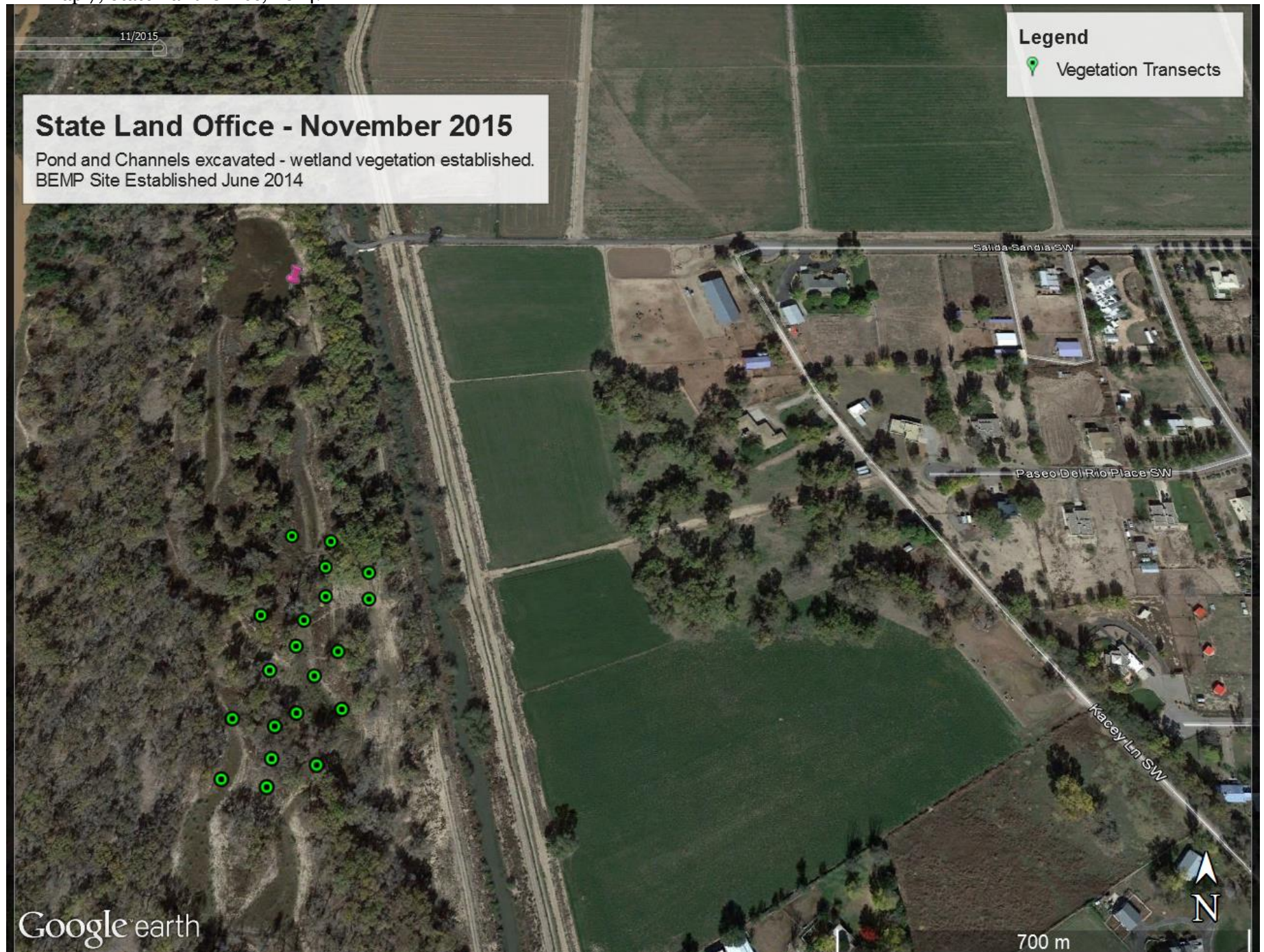




Photo 3. State Land Office – constructed wetland in deep-cut channel; coyote willow and cottonwood regeneration in standing water.

At the Valencia Forest Site almost no tall trees survived the 2007 fire, photo 4. Now there are trees re-establishing at this site; photo 5. Unlike the Crawford site which was modified to allow overbank flooding, this site is dry and therefore all of the trees that we see likely represent resprouts from root crowns that survived the fire. It is really interesting to see how much post-fire difference there is from site to site. Sites like the Crawford site might establish a mature tree density similar to what was there prior to the fire. By comparison, tree density in Valencia Forest is likely to remain low under current management practices. The dataset helps us to see what effect specific management practices through time. As this dataset becomes more long term the results of specific disturbances and management tools become more clear, giving us a better picture of how best to manage our river bosque. Sites that have undergone natural or manmade manipulations or disturbances can be compared to sites like Los Lunas that haven't had much of this. Even at Los Lunas there is a loss of trees. At Los Lunas mature trees have started to fall and it is unclear if they will re-sprout from the roots.



Photo 4. Valencia Forest 2007 after it burned in February of that year. Note the resprouts from some trees. Some of those have survived.



Photo 5. Canopy regrowth at the Valencia Forest Site. Tree killed by 2007 fire in foreground with Rio Grande cottonwood and Gooding's willow beyond.

At the Reynolds sites there's been a long-term effort to reduce exotics and plant native species. In 2004 exotic species were removed and herbicide was applied by the Valencia Soil and Water Conservation District and cottonwood poles were planted at this site. Some of those pole plantings perished but some have survived as can be seen in photo 6. Until recently there was a stark contrast between the exotics in Reynolds Forest and the lack of exotic woody species at Reynold's cleared. In 2012 efforts to remove woody exotics in Reynolds Forest have created a relatively exotic-free space beneath the mature cottonwoods here now that the salt cedars have mostly been eliminated. The entire site was cleared of woody species except for mature cottonwoods.



Photo 6. Reynolds Forest Site, 2015. Cottonwood growth following clearing, exotic control, and pole planting.

The BEMP program monitors the bosque across at least eleven different jurisdictions (Ohkay Owingeh, Sandia, Santa Ana, and Santo Domingo Pueblos; City of Albuquerque Open Space, Elephant Butte Irrigation District, Middle Rio Grande Conservation District, New Mexico State

Parks, State Land Office, The U.S. Fish & Wildlife Service, and the Valencia Soil and Water Conservation District). BEMP is unique in many ways but in the way that it goes across boundaries and provides a set methodology for many different treatments is really amazing in terms of long-term monitoring of our whole river system. We've been fortunate to be part of BEMP for a long time and to watch the changes that take place along our main river in New Mexico. The trends from site to site reflect the river health and give us a better idea of how our management initiatives impact the river that sustains so much life. As you can see in this photographic journey there is much that is happening, some of it quickly, some of it over decades, but all of it is being captured as a reference point for current and future management of river systems and outdoor education opportunities.