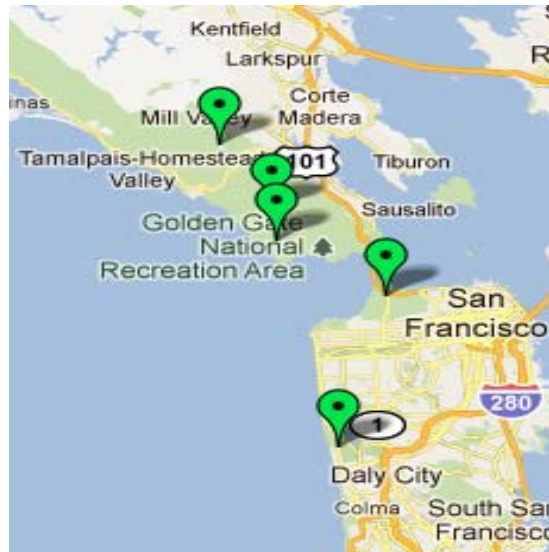




## San Francisco Bay Area National Parks Science and Learning

Connecting Parks, Science, and People

### Native Plant Nurseries Research – Organic Fertilizer Trials



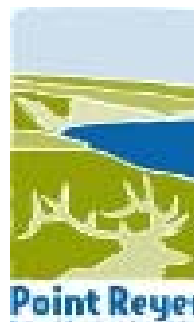
The **Golden Gate National Parks Conservancy (GGNPC)** operates six native plant nurseries in the Golden Gate National Recreation Area. These nurseries aim to produce genetically appropriate, healthy, weed and pathogen free plants for habitat restoration efforts in the park while having the smallest possible environmental impact. The nurseries have grown more than 400 native plant species, and they usually produce around 170,000 individual plants each year.

Research and experimentation has played a key role to improve efficiency of resources used and overall sustainability of nursery production. Areas of research have included exploring alternatives to peat based **germination media**, testing different types of **organic fertilizers** and improving **seed germination** methods for a number of native plants.

There is much more to learn about sustainable nursery practices, and on-going research at the nurseries is critical for informing decisions and putting new information into immediate practice.

Check out various GGNPC Nurseries resources and research projects on the attached pages.

**Topics:** **Biological Resources** , **Ecosystems** , **Physical Resources & Processes**, **Humans & the Environment**, **Museums & Collections'** **Science-based Management**, **Science Communication**  
**Parks, Parks & Protected Areas**





## Home: Native Plant Nurseries Research : Organic Fertilizer Trials

### Organic Fertilizer Trials



**Project Type:** Research **Project Status:** Ongoing

Synthetic fertilizers are often produced from non-renewable resources such as petroleum products. Because they are **water soluble**, they are immediately available for the plants to use, but they can also be easily leached, or lost, when the plants are watered. They also have the potential to damage or overfeed plants if misapplied. Rather than use these fertilizers, the Golden Gate National Parks Conservancy's Native Plant Nurseries are using organic fertilizers that are renewable and naturally sourced. Organic fertilizers often have **insoluble ingredients**, which release nutrients over time, in addition to soluble ones. They are also less concentrated and less likely to damage plants.

There are many organic fertilizer options, however, and many have not been systematically studied. As a result, the nurseries are researching how different organic fertilizers compare, and how to most effectively apply them. Early experiments indicated that **Sustane 4-6-4**, a slow-release pelleted organic fertilizer made in Minnesota out of turkey litter, was a good choice. The nurseries began employing it, but the research did not stop there. In 2008 the nurseries tested Sustane 4-6-4 against six other organic fertilizers such as Sustane (8-2-4), seabird guano (12-12-2.5), Bio-fish (7-7-2), Phyta-Grow (7-5-7 and 8-2-2), and Bull Enterprises (6-6-6) for growing sticky monkey flower (*Mimulus aurantiacus*).



*To best compare them, fertilizer application amounts were calculated to ensure that all contained the same quantity of Nitrogen, the most critical plant nutrient. While most of the fertilizers produced taller plants, **Sustane 4-6-4** and seabird guano performed the best as measured by the plants' root to shoot ratios. In other words, they produced plants with relatively large root systems, a desirable quality for native plants that will need to find water and nutrients quickly upon being transplanted to restoration sites. Since Sustane 4-6-4 is more local than the seabird guano from Peru, it remained the nurseries' top choice.*

In 2009, the nurseries performed another experiment to test the effectiveness of solid (Sustane 4-6-4) versus liquid (Maxsea) fertilizers applied at different frequencies for growing Toyon (*Heteromeles arbutifolia*), a woody plant that would be expected to respond well to slow release fertilization. Sure enough, *the solid fertilizer **Sustane 4-6-4** produced the best root to shoot ratio and root structure*, especially when applied minimally (bimonthly). Monthly Sustane 4-6-4 application resulted in healthier plants, but a less desirable root structure and excessive leafy growth. The liquid fertilizer produced more tender plants with lower root to shoot ratios, although the most ideal application schedule for the liquid fertilizer turned out to be once per month. Recommendations for future trials include testing a more intermediate application frequency for Sustane 4-6-4 (every 6 weeks vs. monthly or bimonthly), a combination of liquid and solid fertilizer applications, and testing of Sustane 4-6-4 applications on herbaceous plants which normally tend to do better with soluble fertilizers. Project Contact: Michele Laskowski Seed Ecologist - Last updated January 9, 2012

