PPQ Navel Orangeworm Sterile Insect Technique Release Program

2026-2030 Strategic Plan

PPQ leadership reviewed this plan in May 2026 and support the direction.
The NOW Program will move forward with implementing this version.

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2026 – 2030 PPQ NOW SIT Strategic Plan

Program Focus

Navel orangeworm (NOW, *Amyelois transitella*) threatens the United States' tree nut industry, especially almonds, pistachios, and walnuts, as well as other specialty crops such as figs, dates, and pomegranates. NOW causes an estimated $800 million in annual losses through direct crop damage and reduced market quality. California, the leading producer of U.S. tree nuts, experiences significant impacts with more than two million acres of orchards vulnerable to infestation. Additionally, California growers face pressure to limit pesticide use due to regulations and environmental impacts. As pesticides become increasingly restricted, the tree nut industry is seeking effective, sustainable tools to manage NOW and strengthen the industry's long-term resilience.

To meet this need, the United States Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS) Plant Protection and Quarantine (PPQ) partnered with the California Department of Food and Agriculture (CDFA) and the nut industry to develop and validate sterile insect technique (SIT) for NOW management. SIT is a pest control method that uses sterilized insects to reduce a target pest population and/or pest damage on a target crop. SIT can be an effective, non-chemical component of integrated pest management strategies. In close collaboration with CDFA and industry, PPQ leads program logistics and methods development required for successful implementation, including sterile moth production, irradiation, handling, transport, and release, and coordinates field trials to evaluate SIT performance in orchards.

This strategic plan outlines PPQ's vision, mission, and five-year roadmap for advancing NOW SIT and preparing CDFA and the industry for long-term adoption. These goals and objectives will guide program development, ensure responsiveness to stakeholder needs, and support the transition of operational responsibility to CDFA and industry partners.

NOW Program Roles and Responsibilities

CDFA

CDFA serves as the primary state partner for integrating SIT into California's NOW management. CDFA is responsible for coordinating with participating growers and managing on-the-ground operations in California, including receiving sterile NOW, conducting quality control, trapping and monitoring at participating field sites, and collecting nut damage data. CDFA helps align regulatory, logistical, and operational needs to support long-term program adoption.

Navel Orangeworm Action Committee (NOWAC)

The NOWAC is a CDFA ad hoc advisory committee established to advise the CDFA Secretary. The NOWAC is composed of almond, pistachio, and walnut producers and processors. The NOWAC represents the industry perspective and helps ensure SIT aligns with grower needs and real-world production conditions. The NOWAC provides guidance on industry priorities, facilitates communication with growers, and supports efforts to build awareness and adoption of SIT as part of integrated NOW management.

Navel Orangeworm Technical Advisory Committee (NOW TAC)

The NOW Technical Advisory Committee, established as a subgroup of the NOWAC, provides scientific and technical guidance for the NOW SIT program. Its members include experts from PPQ, USDA's Agricultural Research Service (ARS), the University of California, and the tree nut industry. The committee advises on key technical aspects, including NOW biology, integrated pest management, insect mass rearing, sterilization, and release methods.

PPQ

PPQ provides national coordination and leadership of the NOW SIT program. PPQ's role focuses on developing, testing, and refining the scientific and operational foundations needed for SIT to be an effective tool. PPQ leads sterile insect production, methods development, field trials, and program evaluation. It also ensures that technical standards, quality control processes, and data needed to validate SIT are in place before the program transitions to state and industry management.

Strategic Goals & Objectives

GOAL 1: Continue to develop and validate SIT as an effective tool for NOW management in almond and pistachio orchards.

Goal 1 objectives and tactics establish the scientific and operational foundations for SIT as a NOW management tool. Objective 1.1 focuses on developing the scientific methodology for a successful SIT release program, while Objective 1.2 ensures this methodology is validated under real-world orchard conditions.

At the request of nut industry stakeholders, PPQ began methods development in 2014 and has since built a strong technical basis for sterile moth production, storage, and handling. Much of the early foundational work, such as identifying suitable strains and establishing rearing processes, has been accomplished. However, ongoing research and development remains essential to improve moth production efficiency and maintain

colony resilience. PPQ will continue to advance these tactics as needed to achieve greater efficiency and resilience. The optimal release mechanism (i.e., airplane, truck rig, hand release, and/or UAS) remains unresolved and represents a key challenge and opportunity. PPQ will prioritize the evaluation of release mechanisms, since the mechanism influences other key processes, such as shipping and handling, release rate, timing, and other logistics.

Objective 1.2 focuses on validating NOW SIT effectiveness in real-world almond and pistachio orchards. These trials are essential for demonstrating damage reduction, understanding how SIT interacts with existing managing practices, and refining operational approaches before broader implementation. To support this effort, the program will strengthen field data collection, review results alongside other NOW management practices, and test release logistics under commercial orchard conditions.

Objective 1.1. Improve sterile NOW production, handling, and release.

Tactics to achieve this objective:

- Continue optimizing NOW strains for improved performance and/or beneficial characteristics for mass production.
- Refine rearing processes to improve NOW fitness and increase production efficiency.
- Evaluate and improve shipping, handling, and/or storage methods at different scales.
- Evaluate moth recapture and performance using different release methods (e.g., airplane, truck rig, hand release, and/or UAS).
- Refine SIT release rates, frequency, and seasonal timing.

Objective 1.2. Conduct release trials in representative orchards to evaluate NOW SIT performance under real world conditions.

Tactics to achieve this objective:

- Test and refine release logistics under real-world field conditions.
- Improve data consistency by conducting almond and pistachio damage assessments to supplement processor grade sheets.
- Review NOW damage data in conjunction with pesticide application and mating disruption.

GOAL 2: Strengthen partnerships with CDFA and industry.

The NOW SIT program is a partnership between PPQ, CDFA, and the California nut industry as represented by the NOWAC. Because the NOW SIT program depends on coordinated efforts across federal, state, and industry partners, clear, consistent, and proactive communication is essential for coordinating logistics, aligning priorities, and preparing for transition. Goal 2 focuses on deepening these partnerships by improving engagement, enhancing information exchange, and ensuring that all partners remain informed and involved as the program evolves.

Objective 2.1. Improve engagement and information exchange among federal, state, and industry partners.

Tactics to achieve this objective:

- Strengthen NOWAC engagement by attending meetings, presenting updates, and facilitating discussions about strategic goals.
- Present methods development updates and discuss priorities with stakeholders.
- Coordinate with state and industry partners to publish information about the program in widely read trade publications.

GOAL 3: Transition California NOW SIT release program to CDFA and industry partners.

Transitioning long-term management of the California NOW SIT release program to CDFA and industry partners will require careful planning, clear roles, and resolution of key challenges. To ensure a smooth transition, PPQ and partners must evaluate how program operations (i.e., moth production, facility operations, and release logistics) can be scaled, financed, and ultimately transferred. Goal 3 focuses on assessing the program's operational and economic viability, developing a shared transition plan that defines responsibilities, resources, and long-term management structures, and ultimately transitioning the program.

Objective 3.1. Assess operational and economic scalability of NOW SIT program.

Tactics to achieve this objective:

- Assess the Phoenix Rearing Facility to identify facility bottlenecks and opportunities to improve efficiency and/or capacity.
- Analyze cost and scalability of release methods (e.g., airplane, truck rig, hand release, and/or UAS).
- Analyze rearing and shipping costs at different staffing and production scales.
- Collaborate with industry to scope additional analyses needed to inform transition.

Objective 3.2. Create a shared plan that defines the roles, responsibilities, and resources needed to transition program oversight to CDFA and industry.

Tactics to achieve this objective:

- Facilitate discussions with CDFA and industry to determine how industry will integrate SIT into existing NOW management practices.
- Define PPQ, CDFA, and industry roles and responsibilities for each phase of the transition.

Objective 3.3. Transition oversight of the California NOW SIT release program to CDFA and industry.

Tactics to achieve this objective:

- Develop materials (e.g., protocols, standard operating procedures) to aid transition of operations from PPQ to CDFA and industry.
- Adjust operations and staffing according to the transition plan.

Five Years At-A-Glance

2026	2027	2028	2029	2030
Collect and analyze field data in representative orchards. *Assess release methodology.* *Strengthen engagement with the NOWAC.* *Assess facility capacity and program costs to inform transition planning.*	*Collect and analyze field data in representative orchards.* *Continue refining release methodology.* *Engage CDFA and industry in transition planning.* *Finalize economic and operational analyses to support transition.*	*Collect and analyze field data in representative orchards.* *Continue refining release methodology.* *Engage CDFA and industry in transition planning.* *Draft transition plan.*	*Obtain feedback on transition plan and revise as needed.* *Draft protocols needed to support transition.*	*Finalize protocols.* *Complete the transition of management of NOW SIT from PPQ to state and industry.*