Public Comment on "Sustainable Pest Management Roadmap" (AKA "Pathway to poisoning the environment for another 25 years")

My public comment is focused on pesticide use in urban areas because of my personal experience and knowledge of pesticide use where I live. These are the broad topics I will cover in detail with specific examples later in my comment:

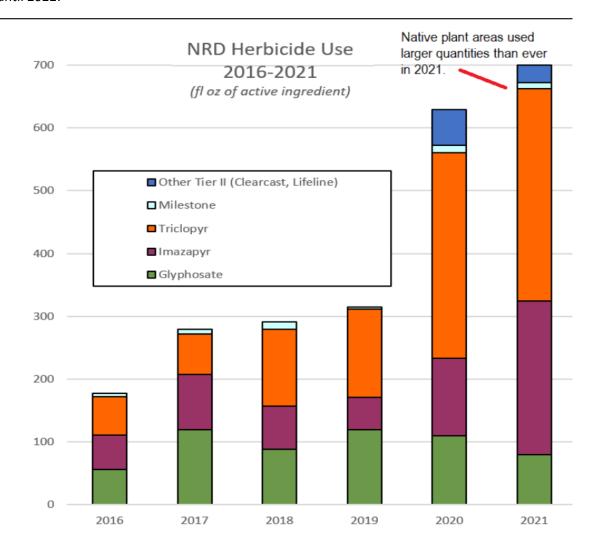
- Since glyphosate was classified as a probable carcinogen by the World Health Organization in 2015 and the
 manufacturer of glyphosate settled 100,000 product liability lawsuits by awarding \$11 billion to those who were
 harmed by glyphosate, public land managers have been engaged in the process of substituting other, usually
 equally or more dangerous herbicides for glyphosate to deflect the public's concerns. The Sustainable Pest
 Management Roadmap (SPM) formalizes this process of substitution without addressing the fundamental
 problems caused by pesticides.
- SPM endorses the status quo that exists now. Affixing the word "Accelerating" to SPM is an extreme case of double-speak that deliberately obscures, disguises, distorts, or reverses the meaning of words. SPM ensures that toxic pesticides will be used in California for more than 25 years, to 2050, and likely beyond. SPM therefore accelerates the damage to the environment that is occurring now. Given that climate change will enable the movement of more pests into areas where they are now suppressed by weather, greater use of pesticides should be anticipated so long as the underlying issue is not address.
- The underlying issue is that pests have been identified for eradication that in some cases cannot be eradicated
 and in other cases should not have been identified as pests either because they are innocuous or because of the
 valuable ecological functions they perform. The key question that SPM does not address is whether pesticide
 use is truly necessary in the first place. Unless we focus on whether a pesticide is actually necessary, all other
 issues are merely window dressing for perpetual pesticide use.
- SPM proposes to identify "Priority Pesticides" for possible substitution without any clear definition of "Priority Pesticides," a process that is ripe for manipulation. Given the substitutions that are occurring now, we cannot assume that further substitutions would be less toxic. SPM puts the classification of "Priority Pesticides" into the hands of "stakeholders" without clearly identifying who stakeholders are. SPM says "stakeholders" were involved in the development of the proposed policy. Those stakeholders included only users and promoters of pesticide use. There was no representation on the Urban Sub-Group of organizations such as Californians for Pesticide Reform, California Environmental Health Initiative, Beyond Pesticides, Center for Environmental Health, Environmental Working Group, etc. Nor was there any visible expertise in the fields of science that are capable of analyzing and evaluating the impact of pesticides, such as soil science, endocrinology, toxicology, entomology, botany, biology, or horticulture. SPM ensures that this exclusion will continue during the implementation phase by suggesting that "experiential and observational" knowledge should be represented on an equal footing with undefined "science." The word "science" is being used and abused by advocates for pesticide use who dangle it as a magic talisman, conferring fraudulent credibility.

Substituting more toxic herbicides for glyphosate

Those who live in cities are often unaware of the pesticides being sprayed in their parks and open spaces. Unless you actually see it happening, it is invisible to you because many land managers do not post pesticide application notices and when they do, they aren't posted for long. Pesticide application notices are not required by California law if the manufacturer claims that the pesticide will dry within 24 hours. Since most manufacturers make that claim, few public land managers post their applications. Two notable exceptions that routinely post their applications are San Francisco's public agencies and East Bay Regional Park District.

Since no good deed goes unpunished, both agencies were under a great deal of pressure to reduce or eliminate use of glyphosate after its chronic lethal health effects were made public by the World Health Organization's decision to classify it as a probable human carcinogen and about 100,000 people who sued the manufacturer settled for \$11 billion for the potentially terminal health conditions caused by glyphosate. These events got the public's attention and where the spraying of glyphosate was visible to them, they objected.

Some public agencies have reduced their use of pesticides. Others substituted different herbicides for glyphosate. Some did both. The Natural Resources Division (NRD) of San Francisco's Recreation and Park Department is responsible for about one-third of all park acreage where they are trying to eradicate non-native plants to benefit native plants. NRD has substituted triclopyr and imazapyr for glyphosate, while also increasing the number of applications and volume of herbicide until 2022:

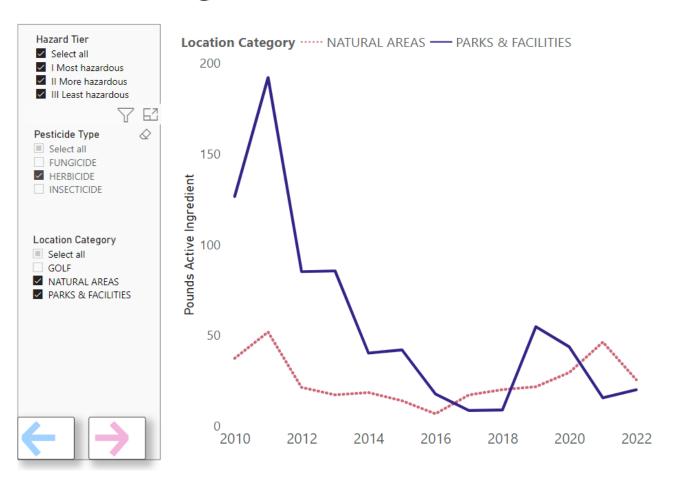


Source: Analysis of Pesticide Use Reports by San Francisco Forest Alliance

Triclopyr and imazapyr are more mobile and persistent in the soil than glyphosate, killing non-target plants. Triclopyr is known to damage mycorrhizal fungi in the soil, damaging non-target plants. Both herbicides are capable of killing the roots of non-target plants and trees. Both have "Warning" risk signal words compared to the less toxic "Caution" risk signal word for glyphosate. There is clearly more health and environmental risk associated with triclopyr and imazapyr than glyphosate. The chronic health effects of these products are less well known than glyphosate because much larger quantities of glyphosate have been used for much longer.

The volume of herbicides in the two-thirds of San Francisco's park acreage that is not managed for the benefit of native plants has been drastically reduced and is now less than the volume of herbicides used by one-third of park acreage managed by NRD for the benefit of native plants:

Pesticide Usage Trends in Parks



Source: San Francisco's IPM Program, Department of Environment

East Bay Regional Park District made a similar decision by banning glyphosate in developed areas, such as parking lots and picnic areas, but continuing to use other herbicides in undeveloped areas of the park, including many specific projects that attempt to eradicate non-native species they consider a problem, such as non-native spartina marsh grass. Spraying of triclopyr herbicides by EBRPD increased 56% while spraying of glyphosate decreased significantly in 2021.

Marin County has taken a different route to satisfy two competing public interests. Concern about the health risks of pesticides and a strong preference for native plants are conflicting interests that are both strong in Marin County. Public land managers in Marin County believe they have threaded the narrow eye of that needle by banning all but organic pesticides on public land and watersheds. A <u>presentation to the California Invasive Plant Council</u> in November 2022 about organic herbicides suggests that organic herbicides do not resolve the conflict between these competing objectives because most organic herbicides on the market are considered more toxic than glyphosate and they are not effective.

Public land managers are responding to the public's concerns about glyphosate by decreasing pesticide spraying in developed areas of parks, but they haven't given up their crusade against non-native plants. And they are using more toxic herbicides to continue their war on introduced plants. These substitutions may be effective for public relations, but they do not make us safer. Reducing pesticide use is the only way to reduce the damage to the environment and human health.

25 more years of escalating pesticide use

SPM makes a commitment to continuing the use of pesticides until 2050, which would compound the damage that pesticides have already done to the environment and to human health. SPM does not propose to reduce the use of pesticides. Rather it proposes to support the development of new pesticides that unqualified "stakeholders" consider less toxic. These are but a few reasons why the "roadmap" is the pathway to destruction:

Climate change is barely mentioned by the SPM proposal, yet it is the primary reason why plants considered "weeds" have gained ground in the past 25 years and will continue to claim more ground in the next 25 years. Higher concentrations of carbon dioxide in the atmosphere have given non-native plants a competitive advantage over native plants. Pests that were suppressed by cold winter temperatures have expanded their ranges into warming regions. These and other changes in the environment have continuously expanded the number of plants targeted for eradication with pesticides. Destroying harmless plants and trees contributes to climate change, by releasing more greenhouse gases into the atmosphere and killing plants that would otherwise absorb carbon dioxide.

Some pesticides and other chemicals **bioaccumulate** in the bodies of animals, including humans. The longer we use those pesticides, the greater the pesticide burden we carry. If you were born before DDT was banned in 1972, you still carry the burden of your exposure to that widely used pesticide before it was banned. Since DDT persists in the environment indefinitely, those who were born after 1972 are still being exposed to it decades after it was banned. Yesterday's mistakes are often mistakes forever.

Plants and animals are continuously adapting and evolving in response to the challenges they face in a changing environment. In the case of plants being constantly bombarded with herbicides, they have developed **resistance to herbicides**. The longer we use herbicides, the more resistant they will become, forcing those who remain on the pesticide treadmill to use yet more herbicide. We are breeding stronger weeds by spraying them continuously with herbicides. SPM mentions resistance in passing, dismissing it as a trivial matter. It isn't.

Every new pesticide opens a new can of worms. Granted, testing is inadequate, but more testing is only as effective as current science allows it to be. For example, the manufacturers of glyphosate claimed for decades that glyphosate could not harm humans because the biological pathway it uses to kill plants doesn't exist in animals. They were wrong. We learned only recently that the <u>pathway used by glyphosate exists in bacteria and those bacteria exist in our bodies, particularly in our guts</u>, where most of our immune functions reside. How many more biological mysteries will be revealed by science in the next 25 years? Meanwhile, **pesticides now considered harmless are doing damage of which we are unaware.** The authors of SPM cannot predict the scientific discoveries that await us in the next 25 years. Therefore, they cannot responsibly make a commitment to continue using pesticides for the next 25 years.

Is eradication of non-native plants necessary?

As I have said, many public land managers have reduced their use of pesticides in developed areas, while increasing pesticide use in undeveloped areas based on the unsubstantiated belief that the mere existence of non-native plants threatens the existence of native plants. Using a few conspicuous examples of attempts to eradicate specific non-native plant species, I will make the case that these attempts are either futile, unnecessary, or do more harm than good.

The 25-year attempt to eradicate *Oxalis pes-caprae* in the so-called "natural areas" of San Francisco's parks are an example of the futility of such attempts. Over 20% of all herbicide spraying by the Natural Resources Division (NRD) of the Recreation and Park Department was applied to kill oxalis in "natural areas" in 2022. NRD sprayed oxalis 35 times in 2021 and 38 times in 2022. From January to March, virtually all the herbicides sprayed by NRD in the so-called "natural areas" were sprayed on oxalis. If it were possible to eradicate oxalis with herbicide, why is there more oxalis now than there was 25 years ago, when NRD (then known as the Natural Areas Program) started spraying herbicides in the "natural areas?"

The <u>University of California Integrated Pest Management Program explains</u> why it's not possible to eradicate *Oxalis pescaprae* with herbicides: "Several postemergent herbicides including triclopyr and fluroxypyr (selective for broadleaf plants) and glyphosate and glufosinate (nonselective) effectively kill the top growth of this weed but are harmful to most ornamentals, so be careful these herbicides don't drift onto desirable plants. These herbicides don't kill the bulbs, and regrowth from bulbs should be expected." In other words, you can kill the above-ground top growth and other nontarget plants in the vicinity, but you won't kill the oxalis. And if you try, you will kill the plants you prefer.

Native plant advocates who demand that this pointless crusade against oxalis continue mistakenly believe that oxalis is killing the native plants they prefer. They are wrong. Herbicides are killing the plants they prefer. Research has been done by scientists at University of Montana to address the question of how competitive oxalis is in plant communities that include native plants: "Oxalis is a poor competitor. This is consistent with the preferential distribution of Oxalis in disturbed areas such as ruderal habitats, and might explain its low influence on the cover of native species in invaded sites." The study also explains why oxalis does not suppress the growth of other plants, including natives. Oxalis makes more phosphorous available in the soil, which essentially acts as a fertilizer for other plants: "These results are consistent with our field data and suggest that Oxalis may improve P availability in the field." In other words, Oxalis pescaprae does not suppress the growth of other plants and, in fact, increases nutrients in the soil.



Coyote hunting (probably gophers) in oxalis in Glen Canyon Park in San Francisco. Copyright Janet Kessler

Garlic Mustard is an example of a non-native species that native plant advocates have tried to eradicate in the Northeast because they believe it is out-competing native plants. A recent study conducted over a period of ten years has found that growth rates of garlic mustard initially increased, but decreased over time and eventually the population started to decline: "A phenomenon that has received increased attention is whether introduced species go through boom and bust cycles, ultimately becoming non-threatening members of local communities." The decline of garlic mustard abundance over time is attributed to negative soil feedback that builds over time as the soil microbial community responds to the new plant. Removing garlic mustard episodically prolongs the process of building that negative soil feedback. When groups of well-meaning young people are sent into the forest to pull garlic mustard, they trample the very native plants they are trying to save. Furthermore, the study found that the suppression of native plants was caused by an overabundance of deer, who prefer native plants. The author of this study advises eradication projects to be wary of doing more harm than good: "Herbicide, disking, and mowing can all have negative impacts on species you are trying protect."

Tropical milkweed (*Asclepias curassavica*) is an example of a non-native plant that has been inappropriately classified as a "noxious weed" in California in response to the demands of native plant advocates, but they weren't satisfied with that classification. They have also succeeded in getting the sale of tropical milkweed banned in four counties in California. Tropical milkweed is not only beneficial to monarchs, it is also ensuring the survival of the species in California by enabling monarchs to adapt to climate change. It is popular with home gardeners because it is a strikingly beautiful plant and it is evergreen, unlike our native milkweed, which is deciduous, therefore not available in winter months.

Monarch butterflies are dependent upon milkweed as its host plant. They lay their eggs on milkweed and their caterpillars eat milkweed. In the past, monarchs in California spent the winter roosting in trees along the coast of California. They did not breed during the winter. They moved inland during summer months where they bred.

Because of global warming, monarchs have begun to breed during the winter months in California and the existence of tropical milkweed in gardens in coastal California has made that possible: "the [monarch] population boom in the Bay Area had not been seen before. It was unusually warm that fall, which may have accounted for the numbers. And tropical milkweed, which unlike native milkweed flowers through the winter and creates a suitable habitat for breeding, was abundant in gardens." ("The Story of the Butterflies," Endria Richardson, Bay Nature, Summer 2022)

Scientists with a commitment to the survival of monarchs have welcomed this development: "But the growth of local, breeding monarchs is seen, at least by some, as a sign of the resilience of the monarchs, their ability to find new ways to persist in the face of an increasingly threatened migration. Might we be seeing the growth of a resident population of monarchs in the Bay Area?" ("The Story of the Butterflies," Endria Richardson, Bay Nature, Summer 2022)

When the nature police succeeded in getting the sale of tropical milkweed banned in San Mateo, Ventura, Marin and Contra Costa counties academic entomologists pushed back against this harmful ban in an article published by The Monterey Herald, San Jose Mercury, Marin Independent Journal, and East Bay Times:

- "Hugh Dingle, a retired University of California at Davis entomology professor who has studied monarch butterfly migration for more than two decades, said the bans are "basically a wasted effort" and that the focus should be on larger threats such as pesticide and herbicide use. All species of milkweed carry parasites that can affect monarch populations, Dingle said."
- "Arthur Shapiro, a UC Davis professor who has studied monarch butterflies for the past six decades, described the rationale behind the bans as "hogwash." Shapiro, Dingle and other researchers said winter breeding among monarch butterflies is a relatively new behavior and one influenced by warmer winter temperatures caused by climate change."
- "David James, an associate entomology professor at Washington State University who has studied monarch butterfly breeding and migration in the Bay Area, said there is a case to be made about the tropical milkweed as being a vital resource for the monarchs in a changing climate."
- "Leslie McGinnis, a UC Berkeley doctoral candidate studying monarch populations and working with gardeners in the East Bay, said the bans take a "simplistic view" of the threats that monarchs face, including the fact that many native milkweed plants supplied to nurseries can also be sprayed with pesticides. The bans, she said, can work to disenfranchise or demonize people that have tropical milkweed who instead could be partners in working to help restore monarch populations."

Native plant advocates are wedded to a past that is long gone. The climate has changed and it will continue to change. Monarchs and other animals are trying to adapt to changed conditions. Their survival depends on their ability to adapt. The native plant movement has become a form of climate change denial. Their irrational hatred of introduced plants is damaging the environment with herbicides and harming wildlife. There is no evidence that tropical milkweed is harmful to monarchs.

There are many other plants that are being sprayed with herbicides in California, solely because they are not native. Many berry-producing plants are not actually invasive, but are being eradicated because birds eat them and spread the

plant into new territory. Spraying Himalayan blackberries, holly, cotoneaster, pyracantha, etc. with herbicides is harmful to birds and also deprives them of food. Native plant advocates claim their eradication projects benefit birds. They don't.

San Franciscans have asked the Natural Resource Division not to spray herbicide on blackberries while they are fruiting because children eat the berries. NRD continues to ignore that request. Nandina is an introduced berry-producing plant that was briefly classified as "invasive" by the California Invasive Plant Council until a knowledgeable person pointed out that the berries of nandina are poisonous to birds and birds do not eat them, saving nandina from being pointlessly eradicated with herbicide.

The attempt to eradicate a hybrid of native and non-native species of spartina marsh grass with 20 years of continuous spraying of imazapyr is an example of several species of non-native plants that are targeted solely because they breed with native plants. Hybrid spartina is being hunted because it outcompetes native spartina. Nativists fear the loss of native spartina as a distinct species. Rather than seeing the potential for a new, improved species of spartina, they see it as a loss of biodiversity, rather than an increase in biodiversity.

Hybridization is an important evolutionary tool that frequently increases biodiversity by creating new species on the margins of ranges where closely related species encounter one another. For example, hybridization is credited with creating over 500 species of oaks all over the world that are well-adapted to their respective microclimates. The rapidly changing climate and the globalization of trade have created more opportunities for hybridization and resulting speciation.

Advances in molecular analysis has informed us of the frequency of hybridization and its benefits to biodiversity: "With the growing availability of genomic tools and advancements in genomic analyses, it is becoming increasingly clear that gene flow between divergent taxa can generate new phenotypic diversity, allow for adaptation to novel environments, and contribute to speciation. Hybridization can have immediate phenotypic consequences through the expression of hybrid vigor. On longer evolutionary time scales, hybridization can lead to local adaption through the introgression of novel alleles and transgressive segregation and, in some cases, result in the formation of new hybrid species."

Restoration and expansion of wetlands is extremely important as we prepare for anticipated rising sea levels. If hardier, denser, stronger hybrid species of marsh grass are available why would we reject that opportunity? Nativist ideology should not deprive us of this opportunity. Endangered Ridgway rails are also deprived of the dense nesting habitat they need to survive predation.

In April 2021, the National Park Service published policy guidance for park managers based on the principles of "Resist-Accept-Direct." The New York Times interviewed the lead author of the policy guidance, who described the new conservation strategy of the National Park Service: "The concept of things going back to some historical fixed condition is really just no longer tenable."

An ecologist and the science coordinator of Acadia National Park in Maine told *NY Times* what this new strategy meant to him and his colleagues. He said that as recently as 2007 protected areas like the national parks were still being thought about as static places that could be preserved forever with the right techniques. "We weren't being trained on

how to manage for change," he said. "We were being trained on how to keep things like they were in the past." That means nearly everyone in his line of work was caught unprepared for the current reality. "You have a whole profession of people having to shift how we think. We were probably always wrong to think about protected places as static."

The National Park Service is a huge bureaucratic organization and each park in the system has a great deal of autonomy. Therefore, we have seen little evidence that national parks in the greater Bay Area are heeding this sensible advice, but they should and eventually they probably will, certainly within the next 25 years. California should follow the National Park Service's lead.

The irrational preference for native species has put us on the pesticide treadmill. Every plant species now targeted for eradication with herbicides should be re-evaluated, taking into consideration the following criteria:

- Is it futile to attempt to eradicate a plant species that is deeply entrenched in plant communities?
- Will the attempt to eradicate the plant species do more harm than good?
- Is the plant species better adapted to current environmental and climate conditions?
- Is the targeted non-native plant making valuable contributions to the ecosystem and its animal inhabitants?

If these questions cannot be satisfactorily answered, the bulls-eye on the targeted plant should be erased. Limiting the number of plants now being sprayed with herbicide is the only way to reduce pesticide use. If the plant isn't a problem, there is no legitimate reason to spray it with herbicide.

"Priority Pesticides" are a shell game

SPM will perpetuate and increase the use of pesticides in California until 2050 and beyond. SPM attempts to mollify the public's concerns about pesticides by proposing to substitute one dangerous pesticide for another equally dangerous pesticide. SPM tries to obscure that agenda by claiming that increased testing and "bringing alternative products to market" will ensure safer pesticides in the future. It proposes to reduce risk without reducing pesticide use. It is an empty promise with no track record of testing or new product development having achieved that goal in the 60 years that pesticides have been heavily used in California.

The newest products are the most likely to be more dangerous than those that have been on the market long enough to observe the problems they cause. Testing did not identify the health problems caused by glyphosate. Health problems became evident only after glyphosate was heavily used for nearly 50 years.

The problems that have been recently identified with products such as chlorpyrifos were not identified by testing. The problems were identified by observing the effect chlorpyrifos was having on children who were exposed to chlorpyrifos.

Neonicotinoids have been banned by many other nations because they are killing insects, but those problems weren't identified by testing. They were identified by observing the disoriented behavior of insects exposed to neonicotinoids. Disoriented bees had to wander away from their hives into oblivion, causing widespread colony collapse before anyone took the toxicity of neonicotinoids seriously.

Testing required to bring newly developed pesticides to market is paid for by the manufacturer of the product. The problems that the product is causing in the environment and in human health are not identified by studies that are paid

for by manufacturers who have no interest in knowing about those problems and every interest in concealing them. Therefore, funding for such studies of products on the market is very limited. There is no doubt that more such studies would identify more problems about which we know little. The only way the problems come to light is when people suffer the health consequences of massive exposure events, such as trainloads of polyvinylchloride burning in a fireball in the middle of a town in Ohio.

Theoretically, testing is required at the federal level that does not occur because of inadequate resources. The EPA is required to conduct biological evaluations of the effect of pesticides on endangered species. Glyphosate has been on the market since 1974, yet the biological evaluation was not done until 2021. The biological evaluation found that glyphosate is "likely to adversely affect" 93% of legally protected endangered and threatened plants and animals:

Table 1. Summary of Species Effects Determinations for Glyphosate (Counts by Taxon).

Taxon	Step 1 Effects Determinations		Step 2 Effects Determinations		
	No Effect	May Affect	Not Likely to Adversely Affect	Likely to Adversely Affect	Totals
Mammals	0	99	24	75	99
Birds	0	108	20	88	108
Amphibians	0	36	0	36	36
Reptiles	0	47	14	33	47
Fish	0	190	11	179	190
Plants	0	948	8	940	948
Aquatic Invertebrates	0	207	22	185	207
Terrestrial Invertebrates	0	160	20	140	160
Total	0	1795	119	1676	1795
Percent of total	0%	100%	7%	93%	

Source: EPA Biological Evaluation of glyphosate

Biological evaluations of most pesticide products have not been done. In the case of the glyphosate evaluation, damage to endangered species were observed decades before the evaluation was done.

"In 1996, Congress ordered the U.S. Environmental Protection Agency (EPA) to test all pesticides used on food for endocrine disruption by 1999. The EPA still doesn't do this today." (https://www.ehn.org/are-pesticides-endocrine-disruptors-2659413208.html) Twenty-five years later, the EPA has not implemented the program, nor has it begun testing on 96% of registered pesticides. Endocrine-disrupting chemicals are "compounds that can block, mimic or interfere with the proper functioning of hormones [that] have been linked to a variety of health problems including obesity, diabetes, respiratory issues, some cancers and negative impacts on the nervous, reproductive and immune systems." Creating new testing requirements, doesn't make them happen. SPM's claim that more testing will be done is an empty promise that creates a false sense of security.

Glancing at the lengthy list of EPA test guidelines might reassure the public, but it shouldn't because it doesn't mean the tests are being done. There are 49 test guidelines "intended to meet testing requirements for human health impacts of chemical substances." SPM should not waste taxpayers' money creating more testing guidelines until the tests are actually done.

Rubber-stamp advisory committees

SPM proposes a process of identifying "Priority Pesticides" for potential substitution or "eventual elimination" in Appendix 9. The process is similar to the process that produced SPM and it predicts the same outcome: a list that will enable the use of pesticides on the same scale and for the same purposes, including eradicating harmless introduced plants that are performing useful functions.

The process begins with staff recommendations that are reviewed by an advisory committee of "stakeholders." The committee of stakeholders that produced SPM for urban settings were committed to the status quo, even including representation of a manufacturer of pesticides. The Urban Sub-Group chairman was the former IPM director of San Francisco's IPM program that reduced pesticide use by public agencies in San Francisco, while increasing pesticide use in the so-called "natural areas" intended to protect native plants. The composition of the Urban Sub-Group predicted that SPM for urban settings was doomed to legitimatize and perpetuate the status quo.

SPM ensures a similar composition of the advisory committee that will recommend "Priority Pesticides" by valuing "experiential and observational knowledge" on the same footing as scientific knowledge. The SPM process protects the status quo and ensures the continued and increasing use of pesticides in California. The advisory committee should be composed of people with expertise in the fields of knowledge that are capable of analyzing pesticides and the impact they have on the environment and on human health, such as soil science, endocrinology, toxicology, epidemiology, biology, botany, horticulture, etc.

In conclusion, there is no cosmetic fix of SPM as it is presently drafted. A new effort would be led by people who are prepared to make a commitment to reducing pesticide use in California with that goal as the guiding principle. If the State of California is not prepared to make that commitment there is no point in performing another shadow dance with the public.