The Old, Grand Prix, and Padua Wildfires: How much did these Fires *Really* Cost?

--Satellite View of the 2003 Southern California Wildfires--

A Preliminary Report on Expenditures and Discussion of Economic Costs Resulting from the 2003 Old, Grand Prix and Padua Wildfire Complex

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Opening Thoughts:

> More often than not what most agencies and individuals report as the total cost of an activity or event is really the financial costs the agency or individual incurred while performing the activity, be it fixing a faucet at home or suppressing a wildland fire. That is, these are out of pocket expenses. When the Forest Service, for example, reports the cost of putting out a fire at $5 million, is that the true economic cost of that fire? The answer is categorically NO. The reported $5 million figure includes the costs of personnel (regular, hazard, and overtime pay), equipment (engines, bulldozers, fixed and rotary wing aircrafts, etc), travel time, etc. This amount does not include: damage to the resource being protected, value of personal and commercial property lost, losses due to closure of airports, schools, businesses, recreation areas, loss of tourism revenues, displacement of workers, increase in health costs due to smoke exposure, the opportunity cost of the investment in fire suppression activities, etc. When all of those impacts are taken into consideration the true cost of the impact of the event hits like a 25-pound sledge hammer. In addition we need to consider the non-market values lost because of the fires, like air and water quality, habitat losses, environmental system functions, and religious values. Until all these values are taken into account we will not have the true picture (Gonzalez-Caban 2005).

Introduction and Overview:

All too often discussions of the costs of wildfires are limited in scope, short-term in perspective, and fail to account for costs other than expenditures on suppression. Although efforts have improved in recent years, little data is kept on costs of wildfire by federal, state, and local agencies and little research exists on this topic in general (Morton et al. 2003). In particular, expenditures by public, private and non-profit sectors as well as market and non-market economic costs resulting from wildfires in the wildland-urban interface (WUI) have not been calculated for any single large WUI fire to date. Perhaps the reason for this is that the costs of these fires are so large and far reaching that it is a challenging research effort to quantify them.

This report will (1) discuss a framework for watershed and ecosystem management that will provide a context for the discussion of costs (2) disclose the preliminary results of an investigation into expenditures by numerous entities during the fires, within the first 18 months after the fires, and estimates for future expenditures while elucidating additional economic costs that are unaccounted for as of yet, and (3) discuss some implications of this preliminary report.

Why We Should Care:

Effects of the Old, Grand Prix, and Padua Wildfires: Ecosystems in Southern California have evolved and adapted to fire over the centuries, becoming resilient to these naturally recurring disturbances. However these ecosystems have changed dramatically over the last century and are experiencing large-scale wildfires that result in severe effects, such as those in 2003. These severe effects indicate a lack of ecosystem resiliency to wildfire. We define ecosystem resiliency as the ability of an ecosystem to experience a disturbance such as wildfire without experiencing severe and long-term negative effects. The high-severity and long-term nature of the effects resulting from the 2003 Old, Grand Prix, and Padua wildfire complex will be measured, in part, in socio-economic terms and will illustrate the ecosystem's current lack of resiliency. Below are some indicators that call into question the current resiliency of the ecosystem.

During the 2003 Old, Grand Prix, and Padua Fire Complex, approximately 100,000 residents were evacuated from communities during the height of the fires for up to a week (many did not return to their homes due to a lack of services for many weeks), 787 total losses and 3,860 partial losses of property were claimed by private citizens and businesses (CDI 2003), and a significant portion of the headwaters to the Santa Ana River watershed was burned: approximately125,000 acres. This severe upper watershed disturbance continues to result in negative down-river water quality and flood impacts.

Table 1 (attached) itemizes expenditures by public, private, and non-profit sectors for this fire complex. These costs total approximately $1.2 billion to date. Keep in mind that these expenditures do not include such economic costs as the loss of income generating capacity, lost recreation opportunities, and degradation of ecosystem services such as clean water, as well as others.

Furthermore, the effects on both the ecological and human communities are ongoing. Eighteen months have past since the fires were extinguished; however local, regional, and national level repercussions are still being felt. Municipalities, water districts, government agencies, communities, and individuals continue to deal with the severe negative effects of the fires. Ongoing examples include: post-fire erosion, closures of burned areas on public land, and trauma to people impacted by the fires. Recovery services are still being provided by local non-profit organizations in the form of help to rebuild homes, deal with emotional distress, and facilitate general transition back to normal life. The American Red Cross estimates they will spend an additional $1.2 million in the process of closing open cases (Chris Baker, personal communication 2005). Additionally, the Federal Emergency Management Agency (FEMA) continues to provide reimbursements to governments for costs incurred as well as grants to individuals and businesses for recovery needs as a result of the fires.

This preliminary report illustrates some of the social and economic costs of the fires resulting from the high-severity effects to both the bio-physical (ecological) and socio-economic (human) components of the ecosystem. It will also illustrate the connection between the two components of the ecosystem as, for example, the bio-physical impacts in the form of post-fire water quality degradation have translated into socio-economic impacts in the form of increased spending on sediment and flood-debris removal.

It is important to mention that there are also benefits that can be attributed to the fires. We make no attempt to quantify benefits (most of them being non-market benefits) and compare them to costs (the ones gathered here being expenditures, however many are non-market costs). This report simply attempts to gather and estimate the most easily calculated out-of-pocket expenses, when they were incurred, and who paid these costs.

We make three assumptions that will be explained further below: (1) That the ecosystem includes not only bio-physical but also socio-economic components, (2) that the high socio-economic costs resulting from the fires illustrate severe impacts to the ecosystem, and (3) that bio-physical impacts resulted in socio-economic impacts, illustrating that the two are interconnected.

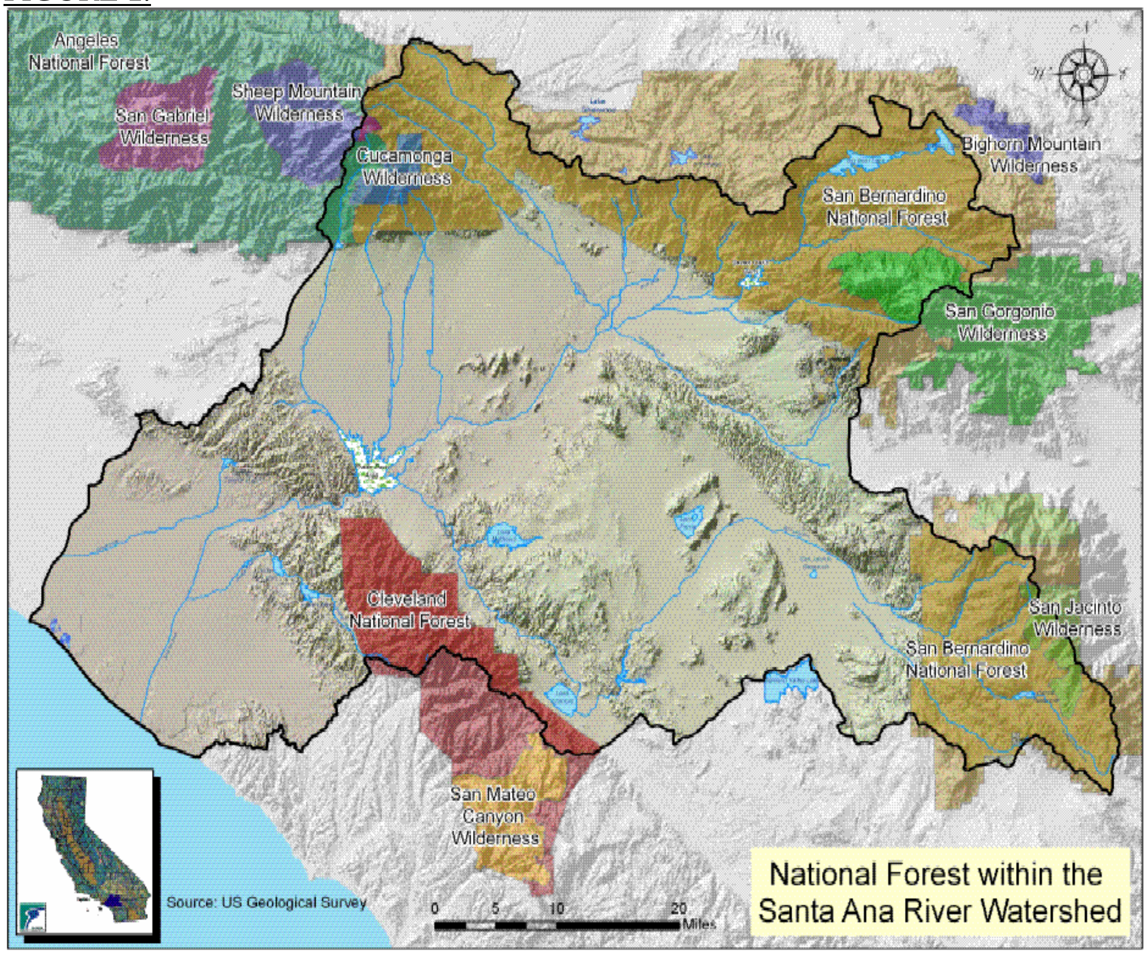
Ecosystem and Watershed Management:

The phrase 'ecosystem management' means different things to different people. We define ecosystem as an interconnected web of bio-physical (air, water, soil, vegetation, wildlife, etc.), social, and economic components. Management of ecosystems recognizes that natural processes often do not recognize public/private, physical/social, and other artificial dichotomies. Natural resource management and classic ecological disciplines have historically considered the 'natural' and 'human' environments separate however have recently come to recognize the fundamental flaw in this approach (Pickett et al. 2004). Humans and their built environment are now recognized as inextricable components of ecosystems—whether they are dominated by humans and structures, sparsely inhabited 'wild' lands, or the interface between them, the Wildland-Urban Interface (WUI). As a result, management of fire in human inhabited wildlands is increasingly challenging (Dwyer and Childs 2003; Scott 1995) and illustrates the need to integrate the socio-economic and bio-physical aspects in managing these systems.

In addition to the realization that humans are highly influential components of the ecosystem, the idea that ecosystems are no longer considered bound by artificial boundaries (Pickett et al. 1992) has also become widely accepted. Recognition that ecological processes such as wildland fire do not stop at jurisdictional boundaries has become a paramount consideration in planning. Furthermore, watershed scale planning and management has gained much favor in recent years as water similarly fails to obey artificial boundaries. Understanding the ecosystem on a watershed scale can meaningfully connect geographic areas formerly thought of as disparate and distant. For example, costs associated with water quality and flood control work that resulted from the 2003 wildfires will be incurred by those far away from the where the fires burned (SAWPA 2003). Watershed scale planning and management can occur across these boundaries and often necessitates involving multiple government agencies as well as non-governmental organizations and local communities (Glick and Clark 1998). The

Santa Ana Watershed Project Authority (SAWPA) is an example of a cross jurisdictional management authority that helps plan across these boundaries. Figure 1 shows the location of federally owned National Forest land, one of many landowners with management jurisdictions in the watershed.

FIGURE 1.



We proceed upon the premise that humans and their built environment are an inseparable component of ecosystems and that the actions that humans take in their local community may affect people and resources in communities thought of as separate or distinct.

Ecological (Bio-Physical) Components: Disturbance events such as the 2003 Southern California fires have brought into question the overall health of the ecosystem. On the one hand, natural disturbance regimes have been more recently understood to be integral aspects of ecosystem function over time. However the degree to which the ecosystem is resilient to disturbances—able to experience disturbance without severe and long-term negative effects—is certainly in question.

With regard to wildfire disturbance, two variables including the *size* of the fire (how many acres it burned) and the *severity* of the post-fire effects (how 'badly burned' the area is) have been the focus of much discussion in the wake of large fires such as the 2003 Old, Grand Prix, and Padua complex. Other variables that interact with each other to affect the size and severity of fires include: fire return interval (how often fire visits the same site on the landscape), the number of human ignitions, changes to vegetation, the effect of fire suppression, as well as less well understood variables such as climate variation. These are important, yet challenging to understand in relation to the resiliency of the ecosystem as a whole. Complicating this discussion is the fact that two different vegetation types with somewhat different fire ecologies burned in the Old, Grand Prix, and Padua fires: chaparral and forest. Synthesizing the complex relationship among these bio-physical variables is far beyond the scope of this paper. Ongoing research in this field will contribute to a better understanding of the complex relationships among these variables. We will briefly discuss two variables affecting resiliency to wildfire: fire *size* and post-fire *severity*.

It has been surmised that fires in the chaparral vegetation type historically burned similar *size* acreages as they do today with similar, severe post-fire effects (Keeley and Fotheringham 2001). Although the size of fires in chaparral may be similar today, the *severity* resulting from these large fires in both chaparral and forest vegetation may be less now than in the past. One of the most influential variables affecting fire *size* is fire weather (Agee 2005), which has stayed more or less the same between the past and present for both vegetation types. However vegetation that acts as fuel—a key variable affecting the *severity* of the fire's effects—has changed to varying degrees. There is some uncertainty and debate about the historical abundance and arrangement of vegetation, and consequently fire severity, in chaparral vegetation types. However, there is ample scientific evidence to suggest that an increase in the abundance and arrangement of vegetation in dry pine and mixed conifer forests has contributed to an increase in the severity of wildfire in these forest types (Brown et al. 2004; Peterson et al. 2005). Because chaparral and forest vegetation burned in the 2003 Old, Grand Prix, and Padua wildfires, both contributed to the high severity of post-fire effects.

The authors of the following quote use wildfire *severity* as it is used in wildfire science: to describe the post-fire effects on vegetation, soils, and other bio-physical variables. They also make specific reference to the detrimental effects high-severity fires can have on the human components of the ecosystem: "These high severity fires are more apt to have detrimental effects on soils, watersheds, and wildlife habitat. And they can have serious consequences for humans who have settled in and around these forests" (Brown et al. 2004: 907). Fires that produce high-severity bio-physical effects in turn often produce high-severity socio-economic impacts, especially in human inhabited ecosystems. Viewed from this perspective, there is very little distinction between the bio-physical and socio-economic aspects of the disturbance on the ecosystem, just different ways to describe them. We will now utilize a socially inclusive definition of wildfire severity that takes into account the effects of wildfire on the socio-economic components of the ecosystem.

Human (Socio-economic) Components: The influx of humans into previously undeveloped wildlands has contributed to an increase in the high-severity of effects resulting from large wildfires. It is important that we understand the relationship between the bio-physical and social resiliency of the system. A lack of resiliency to disturbance affects the management of the ecosystem in different ways.

People increasingly seek to escape urban life and "live in nature" however often do not know how to "live with nature" (Snyder 1999:159). Increasing urban development in wildland fire-prone areas have exacerbated management challenges (Scott 1995). The movement of people across the landscape from urban centers to suburban and rural fringe areas adjacent to wildlands not only creates challenges for managing wildland fire, but for land use planning in general (Dwyer and Childs 2003; Snyder 1999). When people move from one area to the next, they often bring their perspectives with them. As population densities and accompanying expectations for fire protection have increased in this WUI ecosystem, so have the challenges associated with fire management. New comers to these areas also have different ideas for the management of the natural resources. Some do not perceive their environment as a resource to be managed (Dwyer and Childs 2003). Oftentimes human migrations to WUI areas, resulting land-use and development patterns, and social perspectives and expectations people bring with them have detrimental effects on the ecosystem's resiliency to wildfire.

Treatment of one area of the landscape generally has an affect on other areas thought of as distant and separate. For example, patterns of fuel treatment in the wildland landscape can affect the fire intensity or rate of spread in human inhabited communities and consequently has implications for designing landscape-level fuel treatment patterns (Finney 2001). The big picture lesson here is that the wildland landscape is not separate from the Wildland-Urban Interface, nor is it separate from the home itself. In other words, management activities in uninhabited forest areas can contribute to the overall fire resiliency of the ecosystem that includes human communities.

Looking at the fire management problem from a watershed perspective is also necessary and illustrates that the landscape is connected not only at the forest scale, but at the watershed scale. For example, the brunt of the water quality costs incurred as a result of the 2003 fires is being incurred by downstream users as far away as Orange County (SAWPA 2003). The realization that what happens in one area of the watershed can affect another distant area is important. Management actions in these spatially distant yet interrelated areas must be coordinated. Coordinated watershed management can result in positive benefits for both upstream and downstream watershed inhabitants and increase the overall resiliency of the ecosystem. For example, downstream watershed communities may benefit from upstream fuels reduction treatments that mitigate post-fire erosion.

Overall, the relationship that exists between the social and bio-physical components of the ecosystem, particularly in relation to fire, can be improved. Planning that recognizes that these components are distinct yet interconnected will be necessary to mitigate for the current lack of resiliency. The following examples shed some light onto the complex interactions between the bio-physical and socio-economic components of the ecosystem.

Breakdown of Expenditures for 2003 Old, Grand Prix, and Padua Complex:

What does the above discussion of bio-physical, socio-economic effects, and watershed management have to do with expenditures during and after the 2003 fires in Southern California? Let's begin that discussion with a look at the costs of suppressing the fires. Please reference Table 1 (attached) for complete cost breakdown.

Suppression: Suppression expenditures are most often cited by agencies and media as the cost of a fire. Why? Most likely because these figures are the ones readily available to them. Additionally, the challenges to gathering actual costs are explained below:

> At the federal and state level, the environmental, social, and economic impacts of wildfires are difficult to quantify. Much of the information that exists is scattered across bureaucratic lines…Based on our survey of 10 fires, the most costly economic impacts from wildfires are damages to structures and timber and fire suppression However, when fires occur at lower intensity or beyond the wildland/urban interface, the most costly economic impact is fire suppression. (Morton et al. 2003).

So the lesson here is that in places where there are *few* structures and other assets at risk, the highest cost is suppression. A quick look at the attached spreadsheet will reveal why for fires in and around heavily urbanized WUI areas, citing the cost of suppression as THE cost of a wildfire grossly underestimates the expenditures and doesn't address the true economic costs. The proportion of the calculated expenditures for these fires that can be attributed to suppression is only *5 percent*. Important to note is that the costs discussed above refer to costs during the wildfire incident, not post-fire costs.

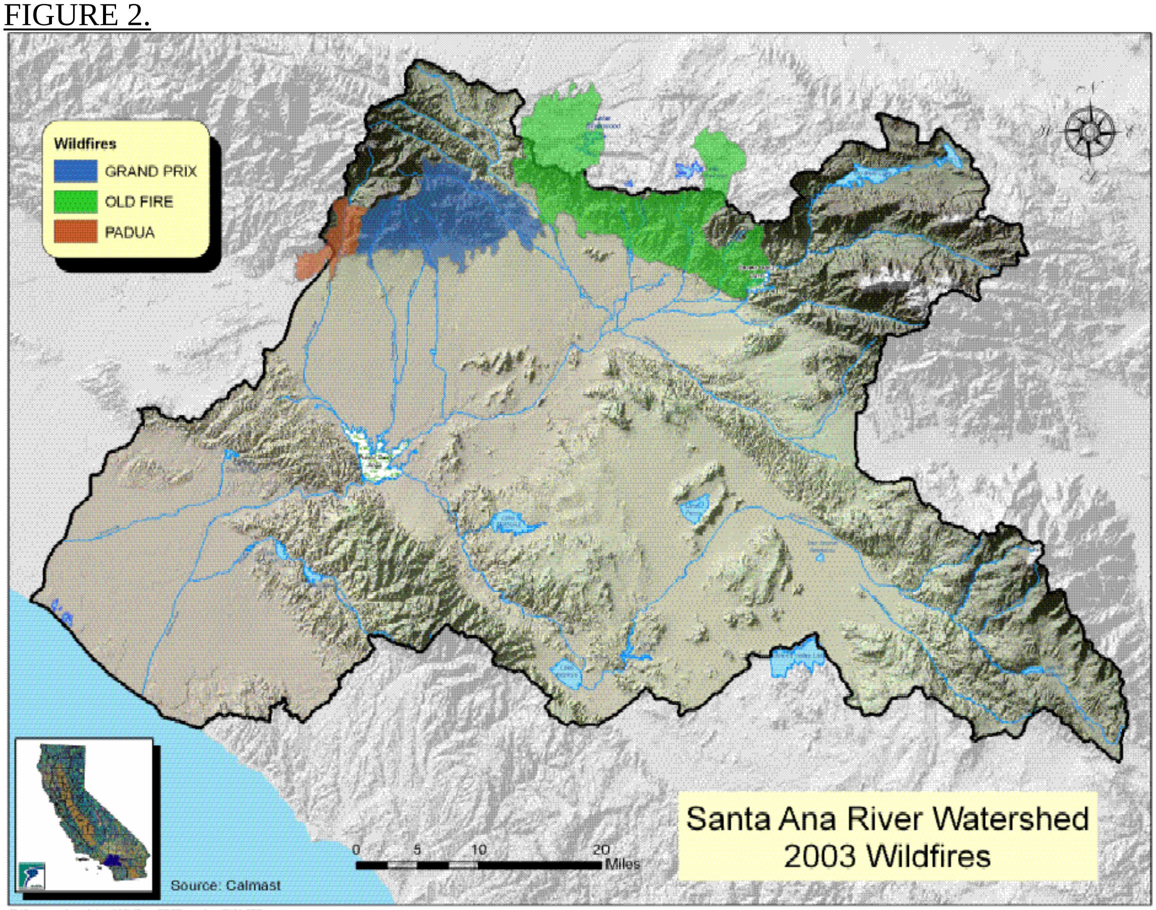
Post-Fire Recovery and Mitigation Costs: In this category we can see what proportion of the expenditures for this quintessential WUI fire complex was incurred after the fires were no longer burning. Approximately 92 percent of the expenditures for this fire were incurred as a result of one or more of the following: Emergency soil erosion mitigation measures; federal grants to public agencies at the state and county level for reimbursement of any wildfire related costs including flood debris and water quality work; grants to private citizens and businesses to recover from damages during the fire; non-profit sector recovery services for individuals suffering physical and emotional post-fire trauma; insurance claims submitted for real property damages or losses during fire; other related post-fire costs. Although news media coverage of wildfire events often stops when the fire is out, many of these post-fire costs are long-term in nature, and are therefore difficult to track with accuracy.

In terms of socio-economic costs, it is obvious that the loss of structures and the resulting insurance claims as well as the damage to critical electrical infrastructure—53 percent of the total costs of these fires: $676,171,965—is enormous. Keep in mind that many residents that incurred losses were un-insured or under-insured according to the local non-profit groups helping residents without adequate insurance coverage (Stuart 2005).

To get a better sense of some of the less obvious bio-physical and watershed scale socio-economic costs to the watershed, let's look at the costs of water quality and flood control work expenditures that were estimated based on a report by the Santa Ana Watershed Project Authority (SAWPA). One of the more salient detrimental effects on both biophysical and social components of the system is post-fire erosion. The increase in post-fire sediment flows, particularly in the mountainous areas of Southern California, has been documented since the late 1940's (Buck et al. 1948) and continues to be of concern for post-fire mitigation and management. The costs of post-fire erosion to both the bio-physical and socio-economic components resulting from the 2003 Old, Grand Prix, and Padua fire complex were unprecedented.

SAWPA's original estimate of approximately one half of a billion dollars for the first five years of post-fire work (SAWPA 2003) was based on a worst case scenario post-fire flood event and the cost incurred by their member water districts to deal with the resulting water quality work. Although the estimated cost of water quality cleanup was underestimated for the first year post-fire, the second storm year was significantly larger and as a result has kept the estimate accurate (Cozad 2005). Figure 2 below shows the location of the burned areas resulting from the three fires in the Santa Ana Watershed:

FIGURE 2.



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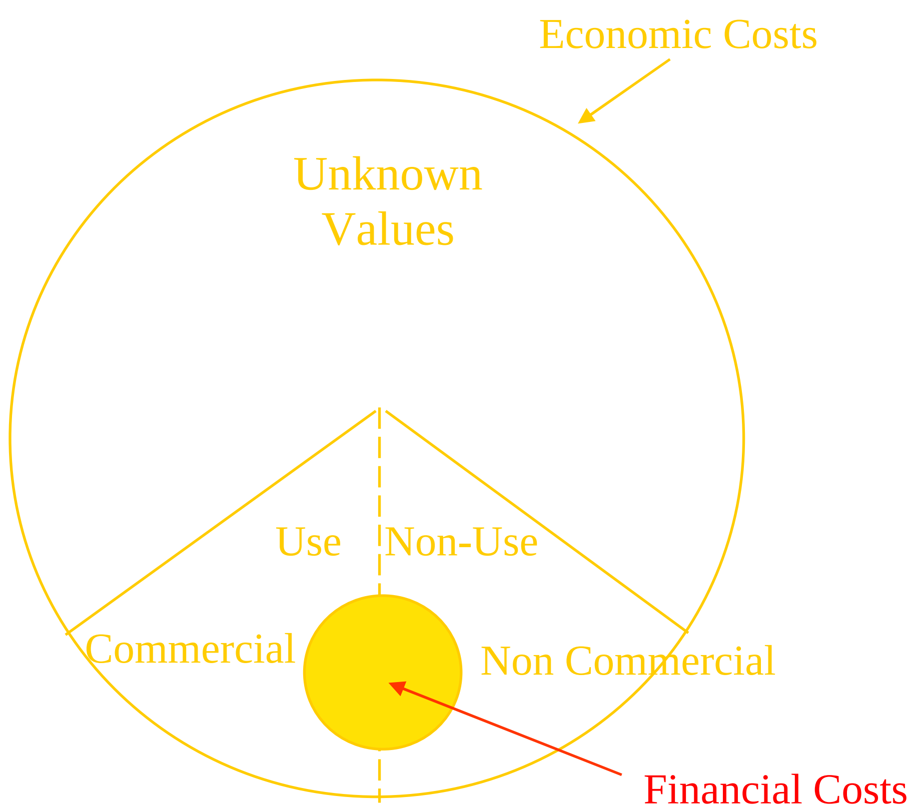
With regard to the human components of the system, it is quite obvious from these figures that the socio-economic consequence of the lack of resiliency to fire, particularly the loss of real property incurred by residents of the WUI, are immense. Not calculated here are some of the less easily calculated, non-market costs: emotional suffering from upheaval and logistical costs of not being able to live a normal life due to lack of a home or vehicle, to name a few.

Although the expenditures accounted for on the attached spreadsheet are daunting, they are not the total economic costs associated with the wildfire. The following section aims to explain the differences between expenditures and economic costs as well as some of the non-market values of both the bio-physical and social components of the ecosystem.

Expenditures vs. Economic Costs:

Figure 3 below shows the proportion of financial costs (expenditures) to the other costs that make up the total economic costs in valuing the environment.

<u>FIGURE 3.</u>



Put within the context of the above chart, the expenditures (financial costs in Figure 1) calculated for the Old, Grand Prix, and Padua Fires at over 1 billion dollars are only a fraction of the total economic costs of these fires on the human, watershed, and other components of the ecosystem.

> "Information on the short-term social impacts from wildfire, such as road closures and evacuations, are included in BAER reports, but long-term social impacts are rarely calculated. However, on-going research efforts are beginning to include measures of social impacts, such as the emotional stress from property loss, reduction in property values, and damage to viewsheds" (Morton et al. 2003).

Research attempting to put an economic value on ecological goods and services, as well as predict economic impacts and costs associated with wildland fire has been in development for years. Recently the work of Loomis et al. (2003) has looked at the relative cost savings from a more frequent fire return interval (time since last fire) to the watershed costs of flood control and water quality in the San Gabriel Mountains of Los Angeles County. Their results indicate that a more frequent fire return interval would provide an annual savings to the Los Angeles County Public Works Department of 24 million dollars per year:

> This 24 million in annual cost savings from avoiding wildfire induced sediment flows does not include additional cost savings from avoiding the need for post-wildfire watershed rehabilitation and infrastructure protection. The inclusion of these additional cost savings from prescribed burning program would further increase the net benefits of such a program (Loomis et al. 2003).

This work indicates that not only would a more frequent fire return interval provide a cost savings in terms of decreased flood debris removal costs to Los Angeles County of 24 million annually, but is also illustrative of the connection between bio-physical and socio-economic impacts. In places such as San Bernardino and Los Angeles Counties, the bio-physical components of the ecosystem are inextricably linked to the socio-economic components as exemplified in this report and the Loomis study. As in many ecosystems around the globe, the impact of disturbances can be described in many different ways. The terms used to describe them may vary from physical to social, economic to biological. Using the example in this case, post-fire water quality and watershed degradation can be described as a negative physical impact as well as a socio-economic impact. Because of the human interdependence with those bio-physical components of the system, we can translate those impacts into terms that describe them socially and economically. The fundamental ecological principal that every component in the system is connected aptly describes the relationship between the clean water that is physical, our human need for the ecosystem to provide it which is biological, our consumptive use of it which is social, and the economic impacts that are incurred when that system is disturbed. This line of reasoning exemplifies why ecosystems cannot be treated as if the bio-physical and socio-economic components are separate.

So What?

A "true" cost accounting of the impacts of wildfires is necessary to plan for a future ecosystem that is more resilient to wildfire. Effective management actions will need to cross jurisdictional boundaries and occur at the watershed scale. The success of these actions depends on how well we have recognized and planned for the interdependence of the human and ecological components of the ecosystem.

Wildfires continue to impact communities on multiple scales. These scales are:

- *Local* as illustrated by the physical and emotional trauma, direct losses in the form of property, and losses of ability to generate income, as well as others.
- *Regional* as illustrated by the down-river water quality costs incurred as far away as Orange County.
- *National* as illustrated by the $576 million in claims to insurance carriers and the $45 million spent by the federal agency FEMA. These costs most likely had ripple effects throughout the national economy.

This report identifies that everyone has a stake in the problem. While watershed scale management implores public agencies to partner together and work across boundaries of jurisdiction, partnerships among public and private entities that cross conventional boundaries are equally important. Decreasing the severity of wildfires can benefit communities far away from wildfire that may not understand their stake in the problem.

Based on the results of this report, wildfires can create:

- *Severe socio-economic effects* in ecosystems people depend on,
- *Severe bio-physical effects* that in turn produce socio-economic ones, and
- *Long-term* effects that impact the ecosystem for years.

As illustrated by this report, the economic costs alone are a compelling reason to increase ecosystem resiliency to wildfire. Scientific research such as the Loomis et al. (2003) study demonstrates that cost savings can be realized through fuels management. Recent scientific evidence shows reducing fuels that feed a fire can be accomplished using mechanical thinning of live vegetation, prescribed fire, or a combination of both (Peterson et al. 2005; Skinner et al. 2004). Additional management actions to complement fuel reduction in the wildlands must address development and growth patterns (Snyder 1999; Scott 1995), building codes, materials, and the clearing of fuels around homes (Cohen 1999), while increasing the awareness among private property owners of their responsibility to mitigate these hazards (Cohen and Savelend 1997). However, these actions will not be successful without a commitment by governments, community organizations, and citizens to *work together* and *sustain a long-term program* that (1) restores resiliency to the ecosystem and (2) maintains it into perpetuity.

Both human-inhabited wildlands and the vegetation that fuels a wildfire are increasing. What is still in question is whether we will plan to “live in nature” or whether we will plan to “live with nature” (Snyder 1999:159) by planning ahead to mitigate the severe effects of wildfires. *Wildfire will return*; it is not a question of ‘if, but rather ‘when’.

TABLE 1.

OLD, GRAND PRIX, PADUA WILDFIRE COSTS

COST TYPE AND ENTITY	EXPENDITURES INCURRED AS OF 4-26-2005	ESTIMATED FUTURE EXPENDITURES	% OF TOTAL
FIRE SUPPRESSION AND EMERGENCY RESPONSE EXPENDITURES:			
PUBLIC AGENCIES:			
USDA Forest Service	$42,064,491.00		
California Department of Forestry and Fire Protection	$14,535,199.00		
Department of Interior-Bureau of Land Management	$1,519,454.00		
County of San Bernardino Fire Department	$1,581,689.00		
California Highway Patrol	$1,634,851.26		
Local Fire Departments Including Running Springs, Big Bear Lake, Crest Forest,	UNKNOWN		
TOTAL OF SUPPRESSION AND INCIDENT MANAGEMENT EXPENDITURES BY PUBLIC	$61,335,684.26		5%
POST-FIRE RECOVERY, WATER QUALITY MITIGATION, AND REIMBURSEMENT EXPENDITURES:			
PUBLIC AGENCIES:			
*Santa Ana Watershed Project Authority Member Water Districts-SAWPA Report Estimating Post-Fire Flood and Water Quality Costs	$45,380,000.00	$401,320,000.00	
PUBLIC ASSISTANCE- Federal Emergency Management Agency-FEMA	$37,649,521.49		
PRIVATE ASSISTANCE-Federal Emergency Management Agency-FEMA	$7,552,796.00		

*Burned Area Emergency Recovery-BAER	$9,000,000.00		
*Natural Resources Conservation Service-NRCS	$4,000,000.00		
*Army Corps of Engineers	$8,500,000.00		
California Department of Transportation-CalTrans	$9,721,108.00	$11,470,000.00	
TOTAL OF REIMBURSEMENT, RECOVERY AND WATER QUALITY MITIGATION EXPENDITURES BY PUBLIC	$121,803,425.49	$412,790,000.00	42%
PRIVATE:			
Top 13 Insurance Companies-California Department of Insurance (Total Claims Submitted-Not Expenditures)	$576,171,965.00		
*Southern California Edison Co.	$70,000,000.00	$30,000,000.00	
TOTAL OF POST-FIRE RECOVERY AND WATER QUALITY MITIGATION EXPENDITURES BY PRIVATE ENTITIES	$646,171,965.00	$30,000,000.00	53%
NON-PROFIT AGENCIES (501C3):			
*American Red Cross, San Bernardino (Future Spending is Approximate)	$2,632,149.00	$1,200,000.00	
*Rebuilding Mountain Hearts and Lives	$1,000,000.00		
TOTAL OF POST-FIRE RECOVERY EXPENDITURES NON-PROFIT ENTITIES	$3,632,149.00	$1,200,000.00	1%

LOSS OF INCOME GENERATING POTENTIAL OR NON-MARKET VALUE AS A DIRECT OR INDIRECT RESULT OF WILDFIRE:			
PRIVATE:			
Railroad Companies Due to Closing of Cajon Pass Rail Corridor	UNKNOWN		

Freight Trucking Industry Due to Closing of Cajon Pass Highway Corridor	UNKNOWN		
Local and Regional Businesses Due To Forest Closure, Evacuation, Smoke, etc.	UNKNOWN		
Private Individuals Who Were Evacuated	UNKNOWN		
PUBLIC:			
Lost recreation value to Public During Forest Closure and Evacuation	UNKNOWN		
Loss of Ecosystem Services/Ecological System Function Values	UNKNOWN		
TOTALS	$832,943,223.75	$443,990,000.00	100%
GRAND TOTAL	$1,276,933,223.75		

*** Indicates number is approximate.**

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