The Economics Benefits and Impacts of SANDAG's Regional Nourishment Project

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Executive Summary

- The economic analysis in this paper was prepared for the San Diego Association of Governments (SANDAG) as part of the 2012 Regional Beach Sand Project II (RBSP II) for San Diego County and funded by the State of California's Department of Boating and Waterways, which is now a division of California State Parks. The purpose of this particular report is to quantify the benefits and impacts RBSP II.
- To estimate these economic benefits and impacts, we conducted a survey of visitors to the RBSP II sites in 2013. We also conducted periodic counts to estimate attendance. Survey respondents were asked about attendance habits, spending, preferences about beach width, as well as standard demographic questions. Highlights of the survey include the following:
    - The average visitor spent an estimated $20.97 per day with overnight visitors spending over five times as much per visitor-day ($49.80) as day-trippers ($8.90).

Average Expenditures Per Person for Overnight Trips vs. Day Trips to the Beach			
Expenditure Type	**Overnight (n=123)**	**Day (n=294)**	**Overall (n=417)**
Lodging	$25.17	$0.00	$7.42
Gas	$4.97	$2.42	$3.17
Restaurants	$8.32	$1.97	$3.84
Alcoholic Beverages	$2.49	$0.56	$1.13
Sundries	$1.23	$0.99	$1.06
Car Rental	$1.42	$0.00	$0.42
Groceries	$5.79	$2.17	$3.24
Parking	$0.42	$0.79	$0.68
Total	$49.80	$8.90	$20.97

    - Approximately half (49%) answered that an increase in beach-width would positively affect their experience at the beach and many indicated that their visitation would increase significantly with increased beach width.

- Overall the project generated $31.9 million in economic benefits yielding a benefit/cost ratio of 1.16. In addition the project generated $32.9 in total economic impact for San Diego County and $37.3 million in total economic impact for the State.
- The project generates $452,977 in direct local (City/County) taxes, and just over $2 million in State taxes.

Summary of Total Benefits from RSBP II Nourishments (PDV = 4%)									
Fill Site	Total Benefits	Benefits per cy	Ben./Cost Ratio	Local Spending	State Spending	Local Tax Revenue	State Tax Revenue	SD County Impact	Statewide Impact
Oceanside	$8,742,090	$29.84	1.63	$3,631,516	$4,035,017	$100,875	$464,027	$7,333,359	$8,303,463
N. Carlsbad	$5,942,596	$27.14	1.48	$3,051,519	$3,390,576	$84,764	$389,916	$6,162,133	$6,977,300
S. Carlsbad	$4,720,953	$33.48	1.83	$2,642,042	$2,935,602	$73,390	$337,594	$5,335,249	$6,041,030
Batiquitos	$4,443,128	$41.92	2.29	$2,351,178	$2,612,420	$65,310	$261,242	$4,747,888	$5,375,969
Moonlight	$1,720,085	$18.70	1.02	$1,026,785	$1,140,873	$28,522	$131,200	$2,073,455	$2,347,745
Cardiff	$554,306	$6.23	0.34	$162,427	$180,474	$4,512	$20,755	$327,999	$371,389
Solana	$1,250,655	$8.81	0.48	$755,874	$839,860	$20,996	$109,182	$1,526,385	$1,728,306
Imperial	$4,545,361	$10.10	0.55	$2,685,816	$2,984,241	$74,606	$298,424	$5,423,646	$6,141,121
Total	$31,919,174	$21.26	1.16	$16,307,156	$18,119,063	$452,977	$2,012,340	$32,930,115	$37,286,323

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Introduction and Overview

The economic analysis in this paper was prepared for the San Diego Association of Governments (SANDAG) as part of the Regional Beach Sand Project II (RBSP II) for San Diego County and funded by the State of California's Department of Boating and Waterways, which is now a division of California State Parks. The purpose of this particular report is to quantify the benefits of the 2012 beach nourishments project.

Methodology

Our analysis can be broken down into eight separate tasks:

1. **Overview of Beaches/Fill Sites:** The first section will provide a brief identification and overview of the beaches that were nourished during the RSBP II.
2. **Beach Survey – Demographics:** In June of 2013, several research assistants were sent to each of the RBSP II receiver sites to survey beach-goers. While we were able to gather a wide range of data regarding San Diego County beach-goers, in this particular section we primarily focus on demographics.
3. **Beach Survey – Spending:** Within the same survey, we also collected data regarding the amount that San Diego County beach-goers spent on various expenditures (groceries, parking, lodging, etc.) during that particular visit to the beach.
4. **Beach Survey - Width Preferences:** The survey also asked beach-goers how many more or fewer times they would visit that particular beach if its width were, respectively, double or half what it was on the day of the survey.
5. **Annual Attendance Estimates:** From May of 2012 to August of 2013, several research assistants were sent to each of the RBSP II beaches in order to perform periodic counts used (in conjunction with survey data) to estimate the annual attendance at the fill site.

6. **Beach-Width Data:** In the sixth section we analyzed the data that we gathered regarding the effects that RBSP II would have of the widths of the beaches in question. We then used these projected beach-widths in order to estimate the positive effects that beach-fills will, all other things being equal, have upon beach attendance over the next 5 years.
7. **Economic Impact on Local Economy:** In the seventh stage of our analysis we used the data gathered in the previous three stages as well as standard input/output (I/O) software (IMPLAN) in order to project the economic impact which the RBSP II project will have for San Diego County over the subsequent 5 years.
8. **Recreational Value: Costs/Benefits:** In the final stage of our analysis we took the data gathered in the previous stages and provide a cost/benefit analysis of RBSP II fills. The benefits that we analyze in this section will be that of recreational benefits at the beach itself along with prevented loss in property value rather than the economic spending for the county that we considered in the previous section.

Section 1: Beach Overview

The beaches selected for nourishment in the 2012 project were a subset of beaches nourished during the 2001 RSBP I project (see SANDAG 2014). This section will discuss very briefly each site, focusing primarily on issues involved in the analysis of recreational value.

The selection of sites for RSBP II was determined by SANDAG and consists of a subset of the sites nourished during the RSBP I fills. The 2012 sites included the following:

i. Oceanside: Just north of the Carlsbad/Oceanside border, the southern reach has somewhat limited access and parking, and is mostly attended by people who live (or rent condos) nearby. Access and parking is better, however, just north near Oceanside pier, which has higher attendance.

ii. N. Carlsbad: This reach stretches from the northern part of the city, which is similar to S. Oceanside down close to Carlsbad Village. Recreational use increases significantly as one moves south, driven by parking, hotels and condos near Carlsbad Village.

iii. South Carlsbad: Two receiver sites exist here, adjacent to South Carlsbad State beach, which is popular with campers.

iv. Batiquitos: Usually referred to as "Ponto" beach, in the southern part of Carlsbad and extending a few hundred feet into the border with Encinitas. This spot is very popular, especially with local residents since parking is generally available.

v. Moonlight Beach: A very popular beach near downtown Encinitas with good amenities and access.

vi. Cardiff: A relatively narrow state beach, which is quite popular.

vii. Solana Beach: A smaller beach located between Del Mar and Cardiff. The most popular beach with the best amenities is Fletcher Cove which can get crowded on busy summer days.

viii. Imperial Beach: The 2012 nourishment includes three adjacent sites located slightly north of the smaller 2001 fill site.

Table 1 (below) shows all of the sites nourished by the two RSBP projects as well as the differences in cubic yardage added to each site during each fill. Leucadia, Del Mar, Torrey Pines and Mission beaches were nourished in 2001 but not in the 2012 project. While Imperial Beach received a much larger nourishment in 2012 than in 2001, the remaining beaches all received a slightly or moderately smaller nourishment in the second project than they did in the first.

Table 1. Beach Fill Volumes (cubic yards) for RSBP I and RSBP II

Beach Fill Volumes (cy)		
Receiver Beach	**RSBP I (2001)**	**RSBP II (2012)**
Oceanside	421,000	293,000
N. Carlsbad	225,000	219,000
S. Carlsbad	158,000	141,000
Batiquitos	117,000	106,000
Leucadia	132,000	n/a
Moonlight	105,000	92,000
Cardiff	101,000	89,000
Solana	146,000	142,000
Del Mar	183,000	n/a
Torrey Pines	245,000	n/a
Mission	151,000	n/a
Imperial	120,000	450,000
Total	**2,104,000**	**1,532,000**

Section 2: Beach Survey - Demographics

In June of 2013, several research assistants were sent to each of the RBSP II beaches in order to survey beach-goers for the purpose of gathering data regarding visitor demographics, spending habits and beach-width preferences of said beach-goers. These research assistants were trained ahead of time as to the proper administration of the surveys in order to prevent inconsistencies across as well as biases within the administrators. A copy of the survey can be found in the appendix to this report.

While we were able to gather a wide range of data regarding San Diego County beach-goers, in this particular section we will focus primarily on those demographics that are relevant to our economic analysis. More specifically, beach-goers were asked whether their trip was a single day trip to the beach or part of an overnight trip to San Diego County beaches, how many days their (overnight) trip to the beach lasted, how many people were in their party during that trip and how frequently they had visited

that beach during the previous year. All other demographic data gathered from this survey will be included in the appendix to this report.

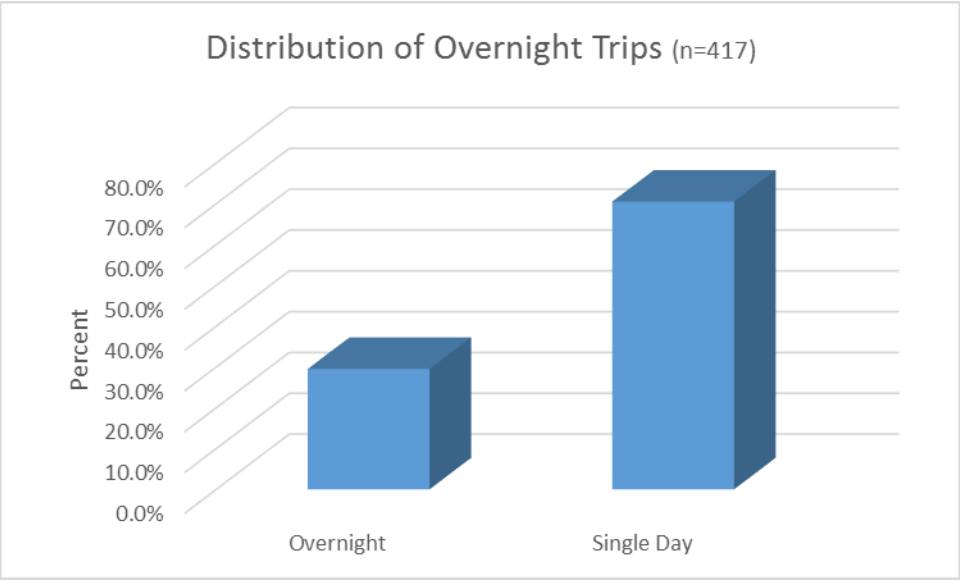

Figure 1. Distribution of Overnight Trips and Day Trips to San Diego Beaches

Respondents were asked, "Is this an overnight trip away from your primary residence?" Figure 1 (above) shows that the majority of the respondents (70.5%) indicated that theirs was merely a day trip, while 29.5% were on an overnight trip, which required some type of lodging. These figures are of particular relevance due to the fact that overnight trips require considerably more spending than do day trips to the beach.

Table 2. Length of Overnight Trips to San Diego Beaches

How many nights will you stay in San Diego County on this Trip?		
1) 1		
2) 2	Responses:	121
3) 3	Mean answer:	5
4) 4		
5) 5		
6) 6		
7) 7		
8) 8-14		
9) 15 or more		

Those respondents who indicated they were on an overnight trip were also asked, "How many nights will you stay in San Diego County on this trip?" Table 2 (above) indicates that while responses varied from 1 ("1") to 9 ("15 or more"), the mean response was 5 ("5").

Table 3. Distribution of Household Size of San Diego Beach-goers

Including yourself, how many people from your household are in your party today?		
1) 1		
2) 2	Responses:	422
3) 3	Mean answer:	3.4
4) 4		
5) 5		
6) 6-7		
7) 8-9		
8) 10 or more		

Respondents were asked how many people from their household, including themselves, were in their party at the beach that day. Table 3 (above) shows that while our 422 responses ranged from 1 ("1") to 8 ("10 or more"), the mean response was 3.4. Given that this mean represents the average response number rather than the average number of people, the latter is probably slightly less than 4.

Table 4. Number of (Previous) Visits to this Beach over the last 12 Months

Not including this trip, how many days have you visited this beach over the past 12 months?		
1) 1		
2) 2	Responses:	371
3) 3	Mean answer:	5.1
4) 4		
5) 5		
6) 6-12		
7) 13-51		
8) Once a week		
9) More than once a week		

All respondents were asked, "Not including this trip, how many days have you visited this beach over the past 12 months?" Table 4 (above) indicates that while responses varied from 1 ("1") to 9 ("more than once a week"), the mean response was 5.1. It should be kept in mind that this was the average response to the survey question and that the average number of annual visits per respondent is likely to be significantly higher than 5.

Section 3: Beach Survey - Spending

The same survey also asked respondents about their spending habits. In particular, respondents were asked how much they spent on various items (groceries, parking, lodging, etc.) during that particular trip to the beach. We then reorganized this data according to the average amount spent per person, per day for each visit to San Diego County beaches.

Table 5. Average Household Spending (per trip)

Expenditures at the Beach (n=417)	
Expenditure Type:	**Mean Spending:**
Lodging	**$149.68**
Gas	**$35.70**
Restaurants	**$54.51**
Alcoholic Bev.	**$16.23**
Sundries	**$9.82**
Car Rental	**$8.46**
Groceries	**$39.96**
Parking	**$4.46**

Respondents were asked, "What is your best estimate of the amount of money your entire household will spend on the following items on this trip to the beach?" Table 5 (above) indicates that, unsurprisingly, the average amount spent on lodging was the highest at $149.68. The average amount spent at restaurants, on groceries and gas were also significant at $54.51, $39.96 and $35.70, respectively. Households predictably spent less overall on alcoholic beverages, sundries (sun tan lotion, batteries, etc.), car rentals and parking at $16.23, $9.82, $8.46 and $4.46, respectively. It should be kept in mind that these figures represent the average amount spent by an entire household during their entire trip to the beach.

Table 6. Average Household Spending (per trip) for Overnight vs. Day Trips

Average Expenditures (per trip) for Overnight Trips vs. Day Trips to the Beach		
Expenditure	**Overnight** (n=123)	**Day** (n=294)
Lodging	$513.14	$0.00
Gas	$101.27	$8.60
Restaurants	$169.72	$7.01
Alcoholic Beverages	$50.69	$2.00
Sundries	$25.12	$3.52
Car Rental	$29.02	$0.00
Groceries	$118.05	$7.69
Parking	$8.51	$2.79

One of the strongest correlates within this data for spending patterns is the difference between overnight and day-trips to the beach, with the former group predictably spending much more on their trips to the beach than the latter group. Table 6 (above) refines the previous data by sorting the spending data according to whether the trip was an overnight trip to the beaches of San Diego County or merely a day trip. As expected, the average spending for most amenities during overnight trips is *much* greater than those of day trips. Again, it should be kept in mind that these figures represent the spending of an entire household during their entire day or overnight trip to the beaches of San Diego County.

Table 7. Average Household Spending (per day) for Overnight vs. Day Trips

Average Expenditures (per day) for Overnight Trips vs. Day Trips to the Beach		
Expenditure	**Overnight** (n=123)	**Day** (n=294)
Lodging	$89.33	$0.00
Gas	$17.63	$8.60
Restaurants	$29.55	$7.01
Alcoholic Beverages	$8.82	$2.00
Sundries	$4.37	$3.52
Car Rental	$5.05	$0.00
Groceries	$20.55	$7.69
Parking	$1.48	$2.79

Another significant difference between overnight and day trips to the beach is that overnight trips, by definition, last longer than day trips and thus cost more money. Table 7 above presents estimates on spending per day at the beaches of San Diego County. While the average spent per day by an entire household on an overnight trip is still larger than that spent by households on day trips (since a day trip typically lasts much less than an entire 24-hour day), the difference is not nearly as dramatic as that in the previous table.

Table 8. Average Expenditures per Person for Trips to the Beach

Average Expenditures Per Person for Overnight Trips vs. Day Trips to the Beach			
Expenditure Type	**Overnight (n=123)**	**Day (n=294)**	**Overall (n=417)**
Lodging	$25.17	$0.00	$7.42
Gas	$4.97	$2.42	$3.17
Restaurants	$8.32	$1.97	$3.84
Alcoholic Beverages	$2.49	$0.56	$1.13
Sundries	$1.23	$0.99	$1.06
Car Rental	$1.42	$0.00	$0.42
Groceries	$5.79	$2.17	$3.24
Parking	$0.42	$0.79	$0.68
Total	$49.80	$8.90	$20.97

One final difference between overnight and day trips that we accounted for was the difference in party size, overnight trips being attended on average by more household members than are day trips. Consequently, in Table 8 (above) we divided each of the expenditures found in the previous table by the average number of beach-goers from the households in order to arrive at the average expenditures per person, per day for overnight and day trips to the beaches of San Diego County.

These figures thus allow us to estimate how much money the average person spends each day at the beach on various amenities. Whereas overnighters spend $25.17 per person, per day at the beach on lodging, day trippers spend nothing, meaning that, overall, the average person spends $7.42 on lodging per day at the beach. An overnighter spends $4.97 per day on gas, while a day-tripper spends $2.42, for an average of $3.17 per person, per day on gasoline. Overnighters spend $8.32 per day at restaurants whereas day trippers spend only $1.97 per day, for an average of $3.84 per person, per day at restaurants. The average overnighter also spends more than the average day-tripper on alcoholic beverages ($2.49 and $.56, respectively) for an overall average of $1.13 per person per day. Overnighters spend slightly more ($1.23) on sundries (lotion, batteries, etc.) than do day-trippers ($.99) each day, for an average of $1.06 per

person, per day. Overnighters obviously spend more than day-trippers on car-rentals ($1.42 vs $0), the average between the two being $.42 per person per day. Overnighters also spend more, on average, on groceries than do day-trippers, ($5.79 vs $2.17) for an overall average of $3.24 per person per day. As far as parking goes, however, day-trippers actually spend more than overnighters ($.79 vs $.42) for an overall average of $.68 per person, per day. Finally, the average overnighter spends a total of $49.80 per day while the average day-tripper spends a total of $8.90. Overall, the average person spends $20.97 per day on their trips to the beaches of San Diego County. In subsequent sections, we will use this figure to calculate the impact that the RSBP II project will have on the local economy.

Section 4: Beach Survey - Width Preferences

The third aim of the survey was to estimate the effects that nourishment and erosion have upon annual attendance to San Diego County beaches. Consequently, we asked beach-goers how many more or fewer times they would visit that particular beach if its width were, respectively, double or half what it was on the day of the survey. These changes in annual attendance will allow us to estimate the impact that the RSBP II beach fills will have on annual attendance counts.

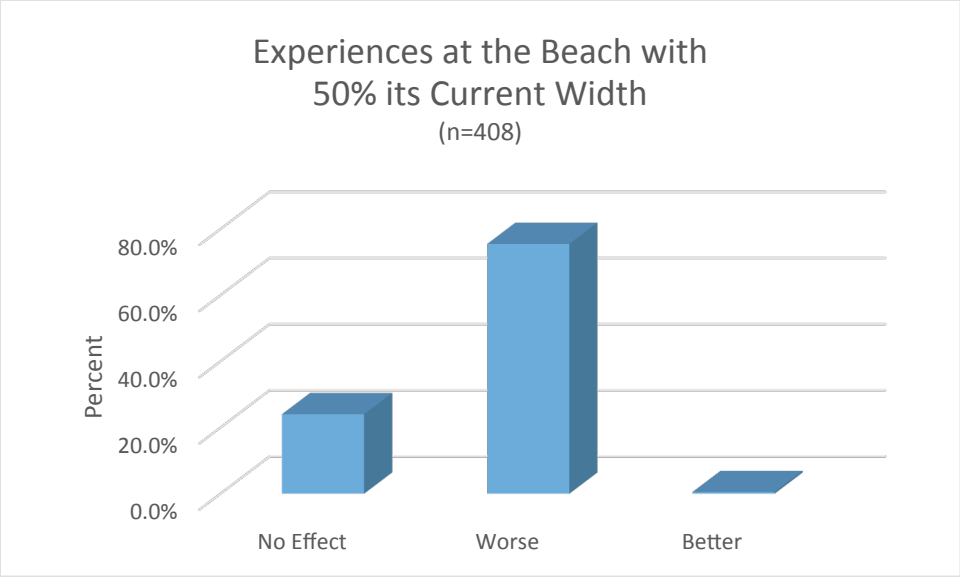

Figure 2. Respondent's Experiences at a Beach with 50% its Current Width

Respondents were asked, "Suppose this beach was half its current width. Would this change your experience at the beach?" Figure 2 (above) shows that **a strong majority (76%) indicated that this decrease in beach-width would negatively affect their experience at the beach**. A significant minority (24%) indicated that their experience would remain unchanged by such a decrease. Less than 1% thought that a decrease in beach-width would make their experience better.

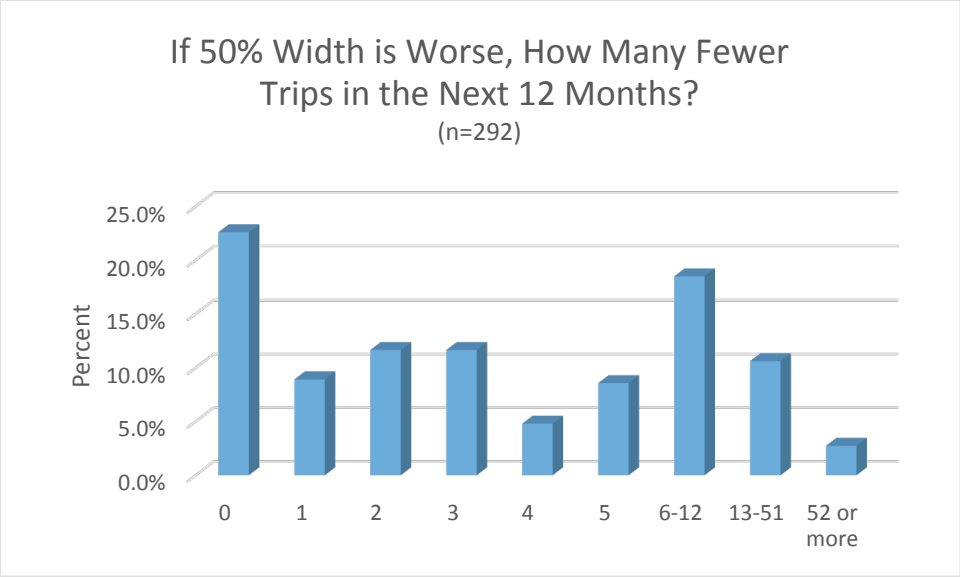

Figure 3. Decreases in Attendance Due to a 50% Decrease in Width

The strong majority who indicated in the previous figure that reducing the beaches width by half would make their experience worse were asked, "If worse, about how many fewer trips to this beach would you take over the next 12 months?" Somewhat unexpectedly, Figure 3 (above) shows that the most popular response (23%) was that the respondent would not decrease their number of visits to the beach at all. Of the remaining 77% who said that they would decrease their number of visits to the beach, the responses were more or less evenly distributed, ranging from "1" to "52 or more". The second most common response among this group came from those who said they would reduce their number of visits to that beach by 6-12 times over the next 12 months.

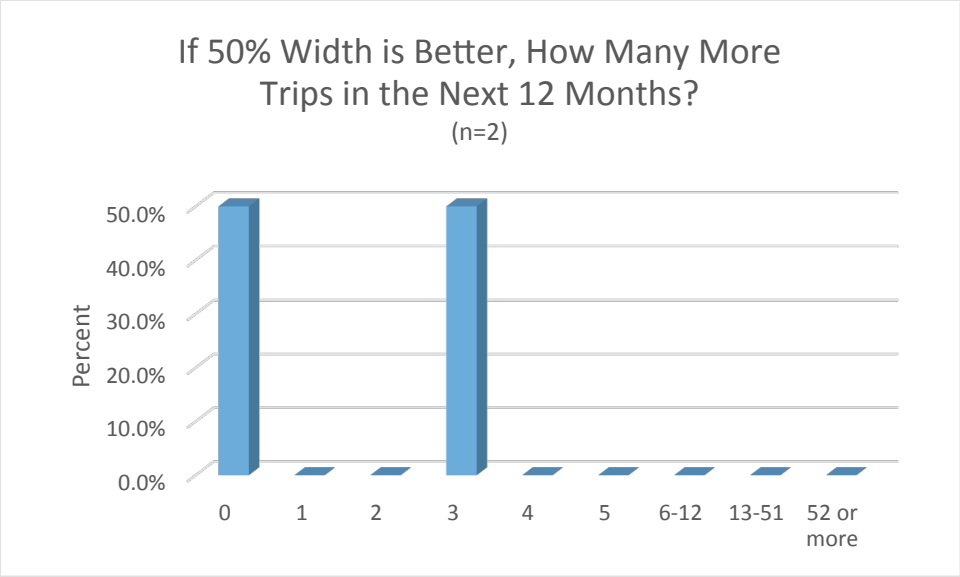

Figure 4. Increases in Attendance Due to a 50% Decrease in Width

The two respondents who indicated that reducing the beaches width by half would make their experience better were asked, "If better, about how many more trips to this beach would you take over the next 12 months?" Figure 4 (above) indicates that one respondent answered that they would not increase their number of visits to the beach at all, while the other indicated that they would visit the beach 3 more times over the next 12 months.

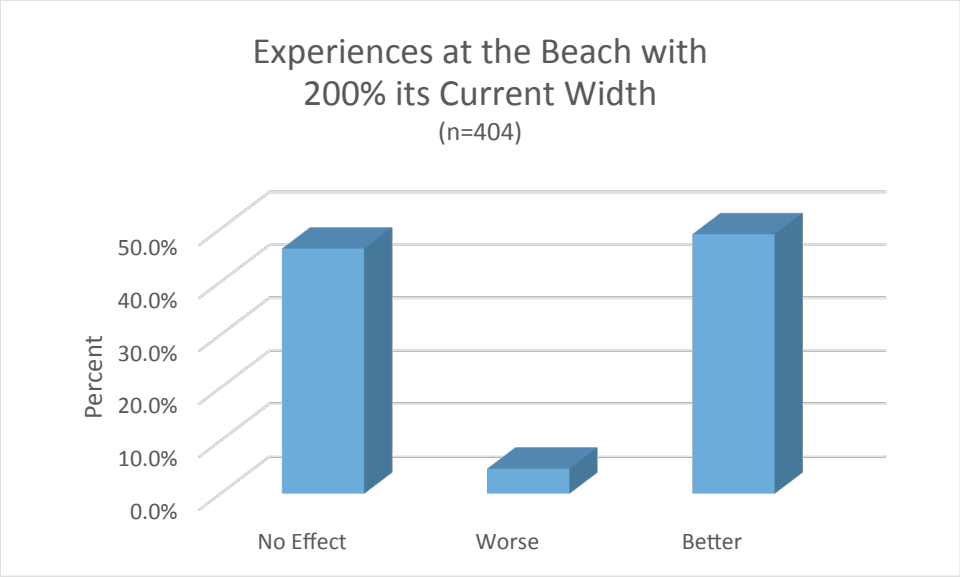

Figure 5. Distribution of Respondent's Experiences at a Beach with 200% its Current Width

While the preceding three figures were concerned with respondents' preferences regarding a smaller beach-width, we were also concerned with their preferences regarding a larger beach-width. Respondents were thus asked, "Suppose this beach was twice its current width. Would this change your experience at the beach?" Figure 5 (above) indicates that of the 404 responses, **approximately half (49%) answered that this increase in beach-width would positively affect their experience at the beach** while, again, almost half (46%) indicated that their experience would remain unchanged by such an increase in beach-width. A small minority (5%) thought that an increase in beach-width would make their experience worse.

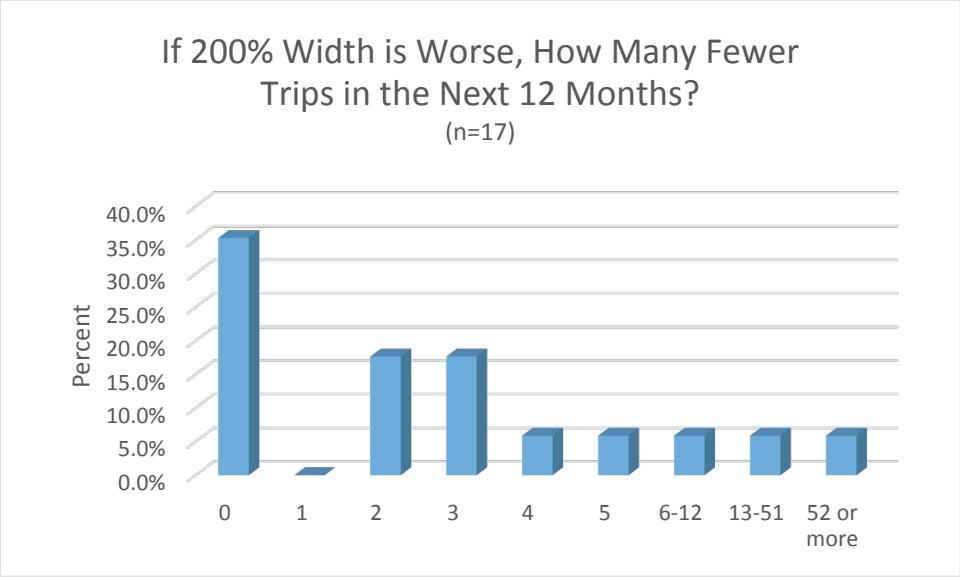

Figure 6. Decreases in Attendance Due to a 100% Increase in Beach-width

The 5% who indicated in Figure 10 that doubling the beach-width would make their experience worse were also asked, "If worse, about how many fewer trips to this beach would you take over the next 12 months?" Figure 6 (above) shows that of these 17 responses, the most popular (35%) was that the respondent would not decrease their number of visits to the beach at all. Of the remaining 65% who said that they would decrease their number of visits to the beach, the more popular responses were a decrease in 2 and 3 visits (18% for each) over the next 12 months with the remaining 30% of respondents indicating that they would decrease their number of visits to the beach by more than 3.

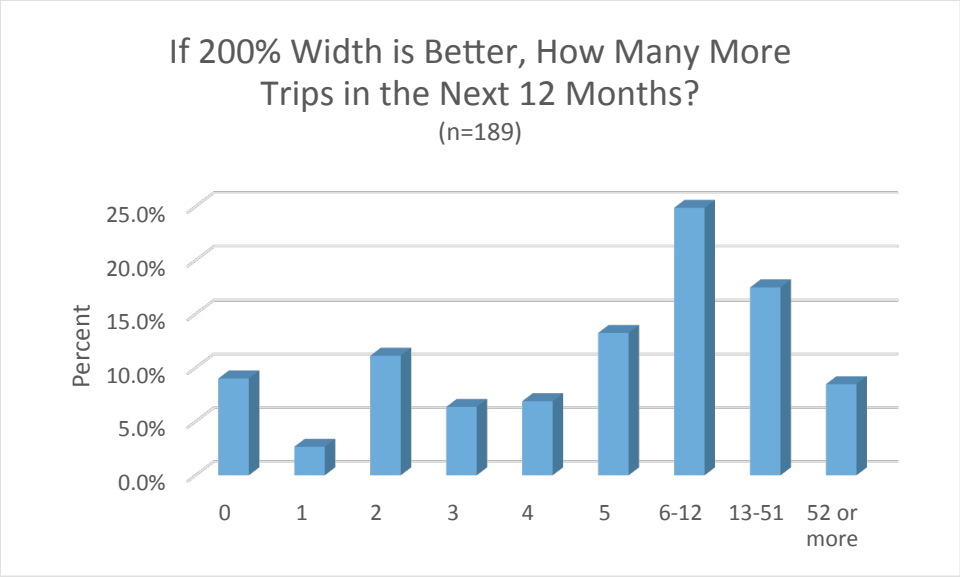

Figure 7. Increases in Attendance Due to a 100% Increase in Beach-width

Those 49% who indicated in Figure 5 that doubling the beach-width would make their experience better were asked, "If better, about how many more trips to this beach would you take over the next 12 months?" Figure 7 (above) shows that of the 189 responses, the most popular (25%) was that the respondent would visits the beach 6-12 times more over the next 12 months. The next strongest responses were very similar with 18% visiting the beach 13-51 times more often and 13% visiting 5 more times. Only 9% of these respondents indicated that they would not increase their number of visits to a wider beach over the next 12 months.

Table 9. Estimated Changes in Annual Visits Due to Changes in Beach-Width

Changes in Annual Visits Due to Changes in Beach-Width			
LOCATION	**Current Attendance**	**50% Current Width**	**200% Current Width**
Oceanside	20.7	-2.8	+6.3
N. Carlsbad	26.8	-7.4	+9.1
S. Carlsbad	22.5	-8.0	+6.7
Batiquitos	37.2	-12.9	+7.6
Moonlight	17.2	-6.3	+9.2
Cardiff	31.4	-5.1	+4.6
Solana	22.8	-5.3	+8.0
Imperial	22.7	-4.3	+6.0
Average	24.3	-6.5	+7.3

We can reorganize the data collected by the preceding 6 questions regarding the effect that beach-width has upon attendance frequencies according to the individual survey locations. Table 9 (above) lists each beach in the first column (the bottom row being the accumulate total of all respondents), the average number of times a respondents visited that beach in the previous 12 months (as gathered in Table 4) in the second column, the average decrease in visits over the next 12 months due to a 50% decrease in beach-width in the third column and the average increase in visits over the next 12 months due to a 100% increase in beach-width in the final column. Overall, the average respondent visited the beach at which they were surveyed 24.3 times in the previous 12 months and would visit that beach 6.5 times less if its width was reduced by 50% and 7.3 times more if its width were doubled.

Table 10. Effects of Changes in Beach-width upon Attendance Frequencies

Effects of Changes in Beach Width Upon Attendance Frequencies			
LOCATION	**50% Current Width**	**200% Current Width**	**Attend./Width Ratio**
Oceanside	-13.4%	30.3%	29.1%
N. Carlsbad	-27.8%	33.8%	41.0%
S. Carlsbad	-35.7%	29.9%	43.7%
Batiquitos	-34.6%	20.4%	36.7%
Moonlight	-36.4%	53.5%	59.9%
Cardiff	-16.1%	14.5%	20.4%
Solana	-23.0%	34.9%	38.6%
Imperial	-19.0%	26.6%	30.4%
Average	-26.7%	30.1%	37.8%

The data in Table 9 can then be generalized in order to express the effects that changes in beach-width have upon attendance frequencies, all other things being equal. The second and third columns in Table 10 (above) express this data in terms of the percentage decrease or increase in attendance that we can expect from halving or doubling the beach-width, respectively. By assuming a linear relationship between these numbers we can divide the difference between the second and third columns by the total difference in beach-width (150%) in order to give us the overall change-in-attendance to change-in-beach-width ratio in the final column. Thus, while the average respondent would visit a half-width beach 26.7% less often than a same beach at full-width, and that they would visit a double-width beach 30.1% more often, we can say that, overall all, their annual attendance varies 37.8% with a 100% change in beach-width.

While most of the overall percentages cluster around the 37.8% average, Moonlight (59.9%) and Cardiff (20.4%) are appear to be outliers. All the other beaches fall well within these two extreme cases.

This data will allow us to estimate the effects that the RSBP II nourishments will have upon annual attendance at each beach in following sections.

Section 5: Annual Attendance Estimates

This section presents estimates of the annual attendance at each of the RBSP II beaches. From May of 2012 to June of 2013, research assistants traveled to beaches across San Diego County in order to conduct periodic counts at each of the RSBP II beaches. For each beach, the assistants performed head counts at various times throughout the year. The daily attendance for each beach was then estimated by multiplying the number of people observed at the beach during the counting by an attendance multiplier. Attendance multipliers (also sometimes referred to as "turnover factor") are used to estimate how many people visit a beach on an entire given day based on how many people are counted at the beach at one particular time during that day[1]. These attendance estimates will then be used in subsequent sections in order to determine both the local economic impact and the increase in recreational value produced by the RBSP II nourishments

Table 11. Attendance Multipliers for Southern California Beaches

Attendance Multipliers		
Time of Count	**Not Surfing**	**Surfing**
10:00 - 11:00	3.05	3.45
11:00 - 12:00	2.65	3.00
12:00 - 13:00	1.82	2.13
13:00 - 14:00	1.66	1.72
14:00 - 15:00	1.51	1.71
15:00 - 16:00	1.58	2.25
16:00 - 17:00	2.03	5.48

Table 11 (above) shows the various multipliers that can be applied to head counts taken at various times of day at Southern California beaches in order to estimate the total attendance at that beach for the entire day. For example, if at 12:30 p.m. we conducted a head count, we would multiply the number of non-

[1] See *Philip Kind, Aaron McGregor (2012).* Who's counting: An analysis of beach attendance estimates and methodologies in southern California. Ocean & Coastal Management 58 (2012) 17 25

surfers we counted by 1.82 and surfers by 2.13 in order to estimate the total number of non-surfers and surfers, respectively, that will have attended the beach for that entire day.

In order to ensure both accuracy and consistency, assistants were trained beforehand as to the proper manner in which these head counts should be performed. For example, assistants were careful to distinguish between and gather accurate samples from both surfers and non-surfers. They were are instructed to perform head counts during both the busy season (May – September) as well as the slow season (October – April). Finally, they also were sure to gather attendance data both during slower weekdays (Monday – Friday during the slow season, Monday –Thursday during the busy season), as well as Fridays during the busy season, in addition to the much busier weekends (Saturdays and Sundays). Thus, assistants gathered representative samples for the 10 different categories of beach trips, as shown in Table 12 (below) for each fill site:

Table 12. Types of Attendance Counts

Types of Attendance Counts			
		Surfing	Non-Surfing
Slow Season (Oct.- Apr.):			
	Sat-Sun	x	x
	Mon-Fri	x	x
High Season (May - Sep.):			
	Mon-Thur	x	x
	Friday	x	x
	Sat-Sun	x	x

From this data we were able to approximate the annual attendance at each beach. Table 12 (below) lists the estimated number of total annual visits to each beach in 2013.

Table 13. Annual Attendance for RSBP II Beaches

Annual Attendance for RSBP II Sites	
Fill Site:	**Annual Attendance:**
Oceanside	363,367
N. Carlsbad	255,144
S. Carlsbad	110,428
Batiquitos	198,918
Moonlight	330,536
Cardiff	93,783
Solana	50,194
Imperial	312,171

It should be noted that with the small exception of Oceanside and Imperial Beaches, these attendance figures are all moderately lower than those provided by previous reports for these beaches. We have chosen in this report, however, to use the more conservative numbers presented in the table above. If, however, annual attendance is more accurately reflected by the previous, higher attendance estimates, then the benefits of the RSBP II project will accordingly be larger than what we estimate in this report.

Section 6: Beach-Width Data

The sixth stage of our analysis involved gathering data regarding the impact that the RSBP II nourishments would have on the widths of the relevant beaches as well as how these increases in beach-width will effect beach attendance over the subsequent 5 years. We were able to obtain from SANDAG data regarding the width of each beach both prior to as well as immediately after the RSBP II nourishments were performed[2]. From this we were able to calculate the percentage increase to each beach-width.

[2] Data regarding beach-width and erosion rates have been made publicly available and can be found at http://www.sandag.org/uploads/publicationid/draft2013beachsandmonitoringreport.zip and http://www.sandag.org/uploads/projectid/projectid_298_16714.zip.

SANDAG also provided us with data regarding the measured and projected changes in beach-width due to erosion over the next 5 years. We were then able to use these projected beach-widths as well as the data collected in section 4 regarding the effects of beach-width on annual attendance in order to estimate the positive effects that the RSBP II nourishments will, all other things being equal, have upon beach attendance over the next 5 years.

The first step in this process involved establishing a baseline against which to measure the impact of the RSBP II nourishments. In order to do this, we must estimate what the beach-widths would have counter-factually been over the subsequent years *had the RSBP II nourishments not taken place*. Consequently, we used the measured erosion to the RSBP II beaches over the last 9 years in order to calculate the average erosion rate for each beach. Given the understandably abnormal erosion rates during both the year of as well as the year immediately following the 2001 RSBP I nourishment event, we limited our data to the years that were at least 2 years after that nourishment but prior to the 2012 RSBP II nourishment.

Table 14. Measured Annual Erosions of RSBP II Beaches (Fall, 2002 – Fall, 2011)

Measured Annual Erosions for RSBP II Beaches (ft.)										
	Fall '02 - Fall '03	Fall '03 - Fall '04	Fall '04 - Fall '05	Fall '05 - Fall '06	Fall '06 - Fall '07	Fall '07 - Fall '08	Fall '08 - Fall '09	Fall '09 - Fall '10	Fall '10 - Fall '11	9-Year Average
Oceanside	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	**-4.2**
N. Carlsbad	-11	-22	1	19	-27	16	12	-18	-12	**-4.7**
S. Carlsbad	-31	-18	5	5	-50	16	-1	14	-34	**-10.4**
Batiquitos	5	-26	-47	66	-63	29	15	-25	-24	**-7.8**
Moonlight	16	-6	-21	60	-78	28	-8	-5	7	**-0.8**
Cardiff	-10	7	-24	61	-91	55	2	-7	15	**0.9**
Solana	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	**-4.2**
Imperial	1	-17	21	81	-75	30	-33	-33	-12	**-4.1**

(note: We used the overall average erosion rate for Oceanside and Solana since their annual erosion data was unavailable.)

The final column of Table 14 (above) shows 9-year average erosion rate for each of the RSBP II fill-sties. The table indicates that both S. Carlsbad and Batiquitos have very high erosion rates at -10.4 and -7.8

ft./yr., respectively. Moonlight and Cardiff, by contrast, experience comparatively mild erosion (-0.8 ft./yr.) and even accretion (0.9 ft./yr.) rates, respectively. N. Carlsbad and Imperial beaches are both very close to the average erosion rate at -4.7 and -4.1 ft./yr. Since erosion data for Oceanside and Solana beaches was not available for the relevant years, we used the overall average erosion rate for the rest of the beaches: -4.2 ft./yr.

Table 15. 5-Year Projection of Beach-widths without RSBP II Nourishments

5-Year Projection of Beach Widths without RSBP II Fills								
Fill-Site Beaches	Fall '11 measured	Erosion Rates	Fall '12 projected	Fall '13 projected	Fall '14 projected	Fall '15 projected	Fall '16 projected	Fall '17 projected
Oceanside	144	-4.2	140	136	131	127	123	119
N. Carlsbad	156	-4.7	151	147	142	137	133	128
S. Carlsbad	80	-10.4	70	59	49	38	28	17
Batiquitos	120	-7.8	112	104	97	89	81	73
Moonlight	204	-0.8	203	202	202	201	200	199
Cardiff	202	0.9	203	204	205	206	206	207
Solana	85	-4.2	81	77	72	68	64	60
Imperial	168	-4.1	164	160	156	152	147	143

(note: we used the overall average erosion rate for Solana and Oceanside since their annual erosion data was unavailable.)

With the measured, pre-nourishment beach-widths (provided by SANDAG) and their average erosion rates (provided in Table 18) in hand, we were able to easily project a 5-year baseline against which to measure the impact of the RSBP II nourishments. Table 15 (above) shows the widths that the beaches would have had from fall 2012 to fall 2017 *if not for the RSBP II nourishments*. It is against these counter-factual beach-widths that we will measure the impact of the RSBP II nourishments.

Table 16. 5-Year Width Projection for the Beaches Nourished in RSBP II

5-Year Projection of Beach Widths							
Fill-Site Beaches	Fall '11 measured	Fall '12 measured	Fall '13 measured	Fall '14 projected	Fall '15 projected	Fall '16 projected	Fall '17 projected
Oceanside	144	251	199	184	184	184	184
N. Carlsbad	156	198	172	196	191	191	191
S. Carlsbad	80	151	116	100	95	95	95
Batiquitos	120	185	140	135	130	125	115
Moonlight	204	225	216	214	209	204	204
Cardiff	202	241	218	222	222	217	217
Solana	85	167	130	110	110	110	105
Imperial	168	327	186	188	188	183	183

SANDAG provided us not only with the measured widths of the RSBP II beaches, but also with projections of beach widths up to 5 years following the nourishment. Table 16 (above) shows the beach-widths that were measured for the RSBP II sites the years prior to the fill (fall, 2011), immediately following the fill (fall, 2012) as well as one year after the fill (fall, 2013). It also shows the width that these beaches are projected to have through the fall of 2017. It should be noted that these latter beach-widths were projected prior to when the 2013 measurements were made available. Notice the large increases that were measured immediately after the nourishments in the fall of 2012, along with the rapid erosion that predictably followed the year after that nourishment. From 2014 on, however, the erosion rates are expected to slow down, approximating the natural erosion rates found in Table 14.

Table 17. Percentage Increase to Beach-widths Due to RSBP II Nourishments

Percentage Increase in Beach Widths With Respect to Width During Survey							
Fill-Site Beaches	Width During Survey	Fall '12 measured	Fall '13 measured	Fall '14 projected	Fall '15 projected	Fall '16 projected	Fall '17 projected
Oceanside	199	55.9%	31.9%	26.5%	28.6%	30.7%	32.8%
N. Carlsbad	172	27.1%	14.7%	31.4%	31.2%	33.9%	36.6%
S. Carlsbad	116	70.2%	49.0%	44.3%	48.9%	58.0%	67.0%
Batiquitos	140	52.0%	25.4%	27.4%	29.4%	31.3%	29.8%
Moonlight	216	10.1%	6.3%	5.7%	3.8%	1.8%	2.2%
Cardiff	218	17.5%	6.5%	8.0%	7.5%	4.8%	4.4%
Solana	130	66.3%	41.1%	29.0%	32.2%	35.5%	34.9%
Imperial	186	87.7%	14.1%	17.4%	19.6%	19.1%	21.3%

From the beach-widths that were measured and projected after the RSBP II nourishments (Table 16), and the widths that we estimated for these beach without the RSBP II nourishments (Table 15), we estimated the positive impact that the RSBP II nourishments will have, all other things being equal, upon these beach-widths. Table 17 (above) expresses the impact of the RSBP II nourishments in terms of a percentage that represents the differences in beach-widths divided by the corresponding beach-width at the time of the administered survey (June, 2013). The percentages are the ratio of the difference between these projected widths (with and without the nourishment) divided by the width of the beach at the time of the 2013 survey, since it is in terms of the preference data collected at that specific time that our report will measure the impact of the RSBP II nourishment on annual attendance.

We can use the data from S. Carlsbad to illustrate the difference between these two interpretations. Table 16 shows that we project S. Carlsbad to be 95 feet wide in fall 2017 due in no small part to the RSBP II nourishment. Table 15 shows that without the nourishment, however, that same beach would have been only 17 feet wide in 2017. Table 17 expressed this difference (78 feet) as a percentage (67.0%) of the width at the time the survey was administered (116 feet) and *not* as a percentage (448.1%) of the projected, non-nourished width (17 feet). This is because we are measuring the impact of the RSBP II nourishment as a

function of the attendance estimates and data collected from surveys during the 2012 - 2013, pre-nourishment season.

Table 18. Percent Increase in Attendance Due to RSBP II Nourishments

Percentage Increase in Attendance Due to Beach Nourishment							
Fill-Site Beaches	Attend./Width Ratio	Fall '12	Fall '13	Fall '14	Fall '15	Fall '16	Fall '17
Oceanside	29.1%	16.3%	9.3%	7.7%	8.3%	8.9%	9.6%
N. Carlsbad	41.0%	11.1%	6.0%	12.9%	12.8%	13.9%	15.0%
S. Carlsbad	43.7%	30.7%	21.5%	19.4%	21.4%	25.3%	29.3%
Batiquitos	36.7%	19.1%	9.3%	10.0%	10.8%	11.5%	10.9%
Moonlight	59.9%	6.0%	3.8%	3.4%	2.3%	1.1%	1.3%
Cardiff	20.4%	3.6%	1.3%	1.6%	1.5%	1.0%	0.9%
Solana	38.6%	25.6%	15.9%	11.2%	12.4%	13.7%	13.5%
Imperial	30.4%	26.6%	4.3%	5.3%	5.9%	5.8%	6.5%

In section 4, we gathered and discussed data regarding the effect that changes in beach-width have upon beach attendance. This data allows us to multiply the changes in beach-width due to the RSBP II nourishments listed in Table 17 by the change-in-attendance to change-in-beach-width ratios from Table 10 in order to estimate the effects that the RSBP II will have upon beach attendance. The second column of Table 18 (above) shows the change-in-attendance to change-in-beach-width ratio from Table 10 which we used to calculate the changes in attendance due to the RSBP II nourishments over the subsequent 5 years in the other columns. It bears repeating, that these percentages are a measurement of the increases in annual attendance due to the RSBP II nourishments compared to what those annual attendances would have been if the nourishment had not taken place. In 2017, for example, S. Carlsbad is projected to be visited 29.3% more often than it would have been visited that year if the nourishment had not happened, whereas the increase in visits at Cardiff for that same year is only 0.9%.

Table 19. Projected Change in Annual Attendance Due to RSBP II Nourishments

Projected Change in Attedance Due to RSBP II Nourishments								
Fill-Site Beaches	2012 Att.	2012	2013	2014	2015	2016	2017	5 Yr. Total
Oceanside	363,367	+50,861	+33,739	+28,011	+30,258	+32,506	+34,754	+210,129
N. Carlsbad	255,144	+25,564	+15,423	+32,875	+32,672	+35,513	+38,354	+180,400
S. Carlsbad	110,428	+25,946	+23,689	+21,376	+23,643	+27,992	+32,341	+154,986
Batiquitos	198,918	+31,857	+18,532	+19,979	+21,427	+22,875	+21,717	+136,387
Moonlight	330,536	+18,831	+12,429	+11,309	+7,437	+3,566	+4,279	+57,851
Cardiff	93,783	+3,229	+1,248	+1,521	+1,443	+926	+848	+9,216
Solana	50,194	+10,228	+7,964	+5,614	+6,244	+6,873	+6,758	+43,682
Imperial	312,171	+65,641	+13,362	+16,476	+18,571	+18,118	+20,213	+152,383
Total	1,714,539	+232,157	+126,385	+137,161	+141,696	+148,370	+159,264	+945,033

We can now use the annual attendance data (Table 13) along with the percentage increase in annual attendance due to the RSBP II nourishments (Table 18) in order to predict how many more annual visits each beach will receive due to these nourishments. Table 19 (above) shows how many more visits each beach will receive each year due, all other things being equal, to the RSBP II nourishments. Over the 5 years following the nourishment, the RSBP II beaches are expected to receive 945,000 more visits than they would have without the nourishments.

Section 7: Economic Impact on Local Economy

In this stage of our analysis we will use the survey data on expenditures per visitor in conjunction with are projections for changes in attendance. The analysis also uses a standard input/output software program (IMPLAN) to project the economic impact which the RBSP II project will have within San Diego County over the subsequent 5 years. In order to do this, we will multiply the attendance increases due to the RSBP II nourishments calculated in the sixth section by the average expenditures for each visit, as calculated in the third section, in order to determine the total increase in

spending which RBSP II would be responsible for within San Diego County over the following 5 years. Finally, we used I/O software in order to determine the indirect as well as induced effects of this increase in spending so as to determine the total, 5-year economic impact that RBSP II would have on San Diego County.

Table 20. Projected Increases to Direct Spending Due to RSBP II Nourishments

Projected Increases in Direct Spending due to Beach Nourishment (PDV = 4%)								
Fill-Site Beaches	2012	2013	2014	2015	2016	2017	5 Yr. Total	5 Yr. Total (PDV)
Oceanside	$1,066,314	$707,334	$587,249	$634,371	$681,493	$728,615	$4,405,376	$4,035,017
N. Carlsbad	$535,948	$323,340	$689,225	$684,970	$744,533	$804,096	$3,782,112	$3,390,576
S. Carlsbad	$543,954	$496,641	$448,141	$495,671	$586,851	$678,031	$3,249,289	$2,935,602
Batiquitos	$667,886	$388,517	$418,870	$449,223	$479,576	$455,294	$2,859,365	$2,612,420
Moonlight	$394,789	$260,581	$237,086	$155,922	$74,757	$89,708	$1,212,843	$1,140,873
Cardiff	$67,703	$26,166	$31,890	$30,255	$19,420	$17,785	$193,220	$180,474
Solana	$214,441	$166,961	$117,696	$130,900	$144,103	$141,689	$915,790	$839,860
Imperial	$1,376,164	$280,142	$345,430	$389,350	$379,854	$423,775	$3,194,715	$2,984,241
Total	$4,867,200	$2,649,683	$2,875,587	$2,970,661	$3,110,587	$3,338,992	$19,812,710	$18,119,063

Using the data regarding the change in attendance due to the RSBP II nourishments found in Table 19 combined with the data regarding the average expenditures per visit to the beach found in Table 8, we can estimate the impact that the RSBP II nourishments will have on direct spending within the local economy of San Diego County. Table 20 (above) shows the annual increase in direct spending due to the RSBP II nourishments, each cell being the product of the projected increase in visits and the $20.97 average spent per visit. The final column indicates that, altogether, the total increase in direct spending for the RSBP II beaches over the subsequent 5 years (with a present discounted value of 4%) will be $18.1 million within San Diego County. On the higher end, Oceanside will be responsible for over $4 million, N. Carlsbad, S. Carlsbad and Imperial will be responsible for roughly $3 million each and Batiquitos will be responsible for over $2 million.

Table 21. Projected Increase in Direct Spending According to Amenity Type

Projected Increases in Direct Spending According to Amenity (PDV = 4%)								
Expenditure Type	2012	2013	2014	2015	2016	2017	5 Yr. Total	5 Yr. Total (PDV)
Lodging	$1,723,289	$938,151	$1,018,135	$1,051,797	$1,101,339	$1,182,209	$7,014,919	$6,414,842
Gas	$736,203	$400,786	$434,956	$449,336	$470,501	$505,049	$2,996,832	$2,740,474
Restaurant	$892,409	$485,824	$527,243	$544,675	$570,331	$612,210	$3,632,692	$3,321,941
Alc. Bev.	$261,898	$142,576	$154,732	$159,847	$167,377	$179,667	$1,066,097	$974,900
Sundries	$246,410	$134,145	$145,582	$150,395	$157,479	$169,042	$1,003,052	$917,248
Car Rental	$97,474	$53,064	$57,588	$59,492	$62,295	$66,869	$396,782	$362,840
Groceries	$751,631	$409,185	$444,071	$458,753	$480,361	$515,633	$3,059,634	$2,797,904
Parking	$157,887	$85,953	$93,281	$96,365	$100,904	$108,313	$642,702	$587,724
Total	$4,867,200	$2,649,683	$2,875,587	$2,970,661	$3,110,587	$3,338,992	$19,812,710	$18,119,063

Similar to Table 20, Table 21 (above) also shows the increase in direct spending for which the RSBP II nourishments are responsible, the only difference being that the latter breaks down these figures down according to amenity type rather than fill location. While the total spending is, obviously, the same as in Table 24, we can see that the RSBP II nourishments will contribute to a $6.4 million increase in spending on lodging within San Diego County along with an approximate $2.7 million increase to gas, $3.3 million to restaurants and $2.8 million to groceries.

Table 22. 5-Year Economic Impact of RSBP II for San Diego County (by impact type)

Total 5-Year Economic Impact of RSBP II			
Impact Type	Employment	Labor Income	Output
Direct Effect	189.9	$7,067,675	$18,786,053
Indirect Effect	39.5	$2,210,972	$6,514,809
Induced Effect	54.8	$2,606,841	$7,629,252
Total Effect	284.3	$11,885,488	$32,930,115

While Table 20 and Table 21 both describe the direct increase in spending which the 2012 beach nourishment will be responsible for, Table 22 (above) describes the various indirect and induced effects ("multiplier effects" as they are called) that must also be taken into account. For example, the $18.7 million increase in spending within the county over the next 5 years will cause many businesses within

the county to themselves spend more on the goods and services which they require in order to meet this increase in demand. Furthermore, this increase in spending will require many businesses to hire on more labor, thus employing more people within the county who will also be spending money which they would not have otherwise had. Using standard Input/Output software (IMPLAN), we can project that over the next 5 years the 2012 beach nourishment will produce a total of $32.9 million increase in economic output for the county in addition to creating 284 new jobs.

Table 23. San Diego County Industries Most Impacted by the RSBP II Nourishments

5-Year Economic Impact of RSBP II by Industry			
Description	**Employment**	**Labor Income**	**Output**
Grocery Stores	60.6	$1,523,791	$4,151,301
Restaurants	59.0	$2,054,331	$3,973,587
Hotels	53.2	$1,951,928	$6,824,159
Gas Stations	18.7	$1,131,327	$2,837,408
Wholesale	7.8	$661,459	$1,256,195
Real Estate	6.4	$182,376	$1,425,463

Table 23 breaks down the economic impact that the RSBP II nourishments will have on San Diego County according to industry. Worth noting, grocery stores and other forms of food and beverage retail create 60.6 new jobs and experience a $4.1 million increase in output. Restaurants and other forms of food service will add 59.0 jobs and $3.9 in economic output. Hotels and gasoline stations will respectively add 53.2 and 18.7 jobs within the county while also experiencing a $6.8 million and $2.8 million increase in output, respectively.

Section 8: Recreational Value: Costs/Benefits

Whereas in the previous section we discussed the economic impact of the RSBP II nourishments on businesses within the surrounding local economy, within this final stage of our analysis we will discuss

the costs and benefits of the RBSP II nourishments at the fill sites themselves. Although the beaches in San Diego County are free of charge, there is nonetheless a recreational value associated with each beach that measures how much, in dollars, a beach visitor is willing to pay for a visit to the beach. An increase in beach-width contributes to an increase in the recreational value of a visit to the beach which, in turn, contributes to an increase in beach attendance. By dividing these benefits by the cost of nourishment, we can estimate the benefit/cost ratio for each nourished beach. In general, benefit/cost ratios of greater than one are considered positive (the value of the nourishments being greater than the price paid for them) and thus justify the expenditure, while projects with a benefit/ratio of less than one are thus viewed as less economically justifiable (the value of the nourishments being less than the price paid). This study used the Coastal Sediment Benefits Analysis Tool (CSBAT) to value beach recreation (per user per day). (See Appendix for technical details.)

Table 24. 5-Year Projection of Unnourished Day Use Values

5-Year Projection of Unnourished Day Use Values						
Fill-Site Beaches	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Oceanside	$19.65	$19.52	$19.38	$19.24	$19.10	$18.96
N. Carlsbad	$20.85	$20.72	$20.59	$20.45	$20.31	$20.17
S. Carlsbad	$18.29	$17.76	$17.16	$16.45	$15.59	$14.44
Batiquitos	$20.69	$20.42	$20.13	$19.83	$19.51	$19.17
Moonlight	$26.28	$26.27	$26.26	$26.25	$26.24	$26.23
Cardiff	$21.78	$21.80	$21.82	$21.85	$21.87	$21.89
Solana	$12.25	$12.11	$11.97	$11.83	$11.67	$11.51
Imperial	$13.92	$13.83	$13.75	$13.66	$13.57	$13.48

Table 24 (above) shows the projected day use values for the RSBP II beaches *had they not been nourished*. With the sole exception of Cardiff, the day use value for each beach gradually decreases over time as the beach-width erodes. The day use value for Cardiff experiences a very slight increase since it average

change in beach-width over time is slightly above zero. (The Maximum day use value possible for any beach is $38.)

Table 25. 5-Year Projection for Nourished Day Use Values

5-Year Projection of Nourished Day Use Values						
Fill-Site Beaches	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Oceanside	$23.56	$22.73	$22.50	$22.59	$22.68	$22.77
N. Carlsbad	$22.50	$22.02	$22.66	$22.66	$22.76	$22.85
S. Carlsbad	$22.53	$21.90	$21.75	$21.90	$22.17	$22.44
Batiquitos	$23.41	$22.52	$22.59	$22.66	$22.73	$22.68
Moonlight	$26.70	$26.61	$26.59	$26.54	$26.49	$26.50
Cardiff	$23.10	$22.53	$22.61	$22.59	$22.44	$22.42
Solana	$15.17	$14.74	$14.42	$14.51	$14.59	$14.58
Imperial	$15.94	$14.82	$14.92	$14.99	$14.98	$15.05

In contrast to Table 24, Table 25 (above) shows the projected day use values for each of the *RSBP II nourished* beaches over the 5 years following the nourishments. The first column corresponds to the day use value during the fall beach measurement immediately following the 2012 nourishment and as such is somewhat higher than the subsequent years. The table clearly shows the gradual erosion of day use value over time caused by the beach-width slowly eroding over time.

As noted in section 3, beach-visitors state that an increase in beach-width would lead to a corresponding increase in their annual attendance at that beach. This should come as no surprise since the increase in day use value caused by an increase in beach-width can easily be construed as the very cause of such an increase in beach attendance. Larger recreational values for a visit to the beach express a greater desire for, and therefore a higher frequency of visits to that beach. Thus, an increase in beach-width not only contributes to an increase in the recreational value for a visit to the beach, but also contributes to an increase in the number of visits to that beach.

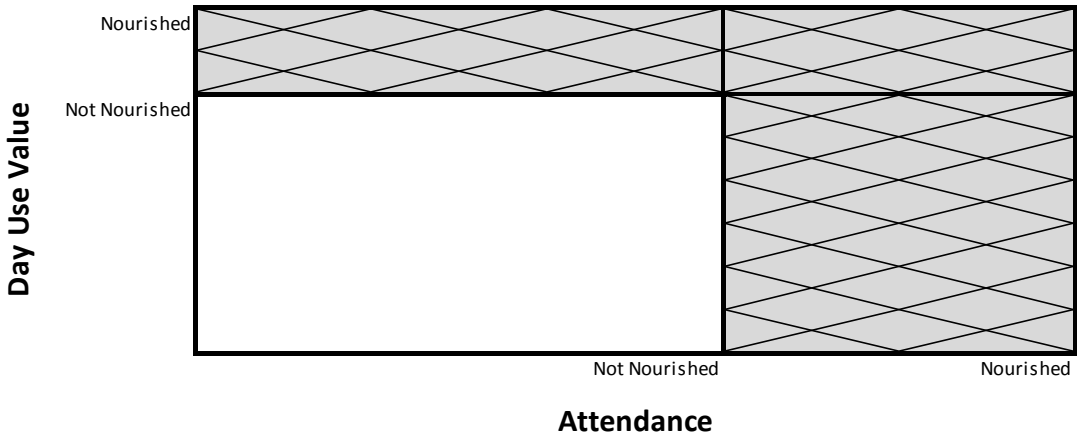

Figure 8. Measuring Increases in Recreational Value

We can, therefore, use the projected increases in both day use value and beach attendance in order to estimate the total recreational benefits produced by the RSBP II nourishments. The smaller rectangle in Figure 8 (above) represents the total recreational value of an unnourished beach as the product its day use value per visit (the vertical axis) and its number of visits (the horizontal axis). The figure also shows how nourishing a beach, thereby causing an increase in both its day use value per visit and its number of visits, expands the beaches total recreational value to a larger rectangle. In order to calculate the economic benefits of nourishing a beach, we must find the difference between the total recreational values of the unnourished and nourished beaches (the grey area).

Table 26. Discounted Recreational Benefits from RSBP II Nourishments

Discounted Recreational Benefits to RSBP II Nourished Beaches (PDV=4%)							
Fill-Site Beaches	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**5 Yr. Total**
Oceanside	$2,028,164	$1,243,395	$992,159	$1,030,717	$1,064,881	$1,094,933	$7,454,249
N. Carlsbad	$856,936	$478,507	$986,942	$943,053	$986,677	$1,025,719	$5,277,834
S. Carlsbad	$845,617	$682,223	$590,697	$629,496	$719,439	$802,394	$4,269,866
Batiquitos	$1,113,287	$585,821	$607,570	$626,825	$643,743	$587,421	$4,164,668
Moonlight	$584,452	$368,365	$322,311	$203,925	$94,060	$108,521	$1,681,634
Cardiff	$161,990	$59,388	$69,544	$63,453	$39,219	$34,543	$428,137
Solana	$234,388	$167,932	$113,311	$121,322	$128,578	$121,535	$887,067
Imperial	$1,542,800	$332,018	$393,739	$426,809	$400,367	$429,563	$3,525,296
Total	$7,367,635	$3,917,648	$4,076,274	$4,045,599	$4,076,965	$4,204,630	$27,688,752

Table 26 (above) shows the projected benefits of the RSBP II nourishments at each beach over the next 5 years (with a discount rate of 4%). The final column of the table shows the 5-year total of the present discounted increase in recreational value that could be anticipated if beach nourishment activities were undertaken at these beaches. The nourishment at Oceanside produced the largest benefits ($7.4 million) due in large part to its large increase in attendance. N. Carlsbad also experiences significant benefits ($5.2 million), due to its dramatic increase in its day use value. The nourishments at S. Carlsbad, Imperial and Batiquitos Beaches also produced large benefits over the next 5 years ($4.2 million, $3.5 million and $4.1 million, respectively). The other nourishments all produced less than $2.0 million dollars in recreational benefits over the next 5 years, with Cardiff experiencing the smallest increase in benefits at $428,000. Altogether, the RSBP II nourishments produce an additional $27.7 million in recreational benefits.

These projected benefits allow us to provide a benefit/cost ratio for each of the RSBP II nourishments. By dividing the recreational benefits listed in the final column of Table 26 by the cost of nourishment, we arrive at the benefit/cost ratio for each beach. The total cost of nourishing each beach can easily be calculated by dividing the multiplying the amount of the sand-fill at each beach (in cubic yards) by the cost of the sand-fill ($18.28 per cubic yard).

Table 27. Summary of 5-Year Recreational Benefits/Costs from RSBP II Nourishments

Recreational Benefits/Costs due to RSBP II Nourishments (PV=4%)				
Fill Site	Beach Fill (cy)	Increase in Rec. Value (PV)	Rec. Value per Cubic Yard	Rec. Value to Cost Ratio
Oceanside	293,000	$7,454,249	$25.44	1.39
N. Carlsbad	219,000	$5,277,834	$24.10	1.32
S. Carlsbad	141,000	$4,269,866	$30.28	1.66
Batiquitos	106,000	$4,164,668	$39.29	2.15
Moonlight	92,000	$1,681,634	$18.28	1.00
Cardiff	89,000	$428,137	$4.81	0.26
Solana	142,000	$887,067	$6.25	0.34
Imperial	450,000	$3,525,296	$7.83	0.43
Total	1,532,000	$27,688,752	$18.07	0.99

Table 27 (above) summarizes the recreational benefits which will be produced by the nourishment of each individual beach. The table lists, in order, the name of each fill site, the volume of sand with which the site was nourished and the increase in recreational value at that location from the nourishment. The table also expresses the increases in recreational value at each site in terms of the cubic yardage and the monetary cost of each nourishment. The benefits from recreational value from nourishment at Oceanside, N. Carlsbad, S. Carlsbad, Batiquitos and Moonlight beaches all justify the costs of nourishment, each having a recreational benefit to cost ratio of 1.00 or more. Cardiff, Solana and Imperial beaches all have recreational benefit to cost ratios of less than 1.00 and as such do not justify their nourishments. The reasons for these low ratios are different for each of these beaches. The fill at Cardiff, for example, suffers from a small increase in its day use value since the increase in its beach-width is relatively small. While Solana, by contrast, does experience a significant increase in day use value, its overall benefits are still low due to low attendance numbers at the beach. The site at Imperial Beach had both a moderate increase in day use value as well as a robust annual attendance. Unfortunately, the disproportionately large size of the nourishment made the large costs difficult to match at that site. Overall, the RSBP II project has a benefit/cost ratio of .99 with respect to recreational benefits only.

Table 28. Value of Storm Damage Prevented by RSBP II Nourishment

Value of Storm Damage Prevented by RSBP II Nourishment (unadjusted)							
	Fill Length	Fall '12 measured	Fall '13 measured	Fall '14 projected	Fall '15 projected	Fall '16 projected	Fall '17 projected
Oceanside	4,300	$379,427	$216,461	$179,712	$194,133	$208,553	$222,974
N. Carlsbad	3,100	$114,767	$62,302	$132,802	$131,982	$143,459	$154,935
S. Carlsbad	1,600	$103,378	$72,210	$65,158	$72,069	$85,326	$98,583
Batiquitos	1,400	$80,831	$39,490	$42,575	$45,660	$48,745	$46,277
Moonlight	800	$13,821	$8,603	$7,827	$5,148	$2,468	$2,962
Cardiff	1,600	$48,375	$18,052	$22,001	$20,873	$13,398	$12,270
Solana	1,600	$109,449	$67,851	$47,830	$53,196	$58,561	$57,581
Imperial	4,100	$530,537	$85,291	$105,168	$118,540	$115,648	$129,020
Total		$1,380,586	$570,260	$603,074	$641,600	$676,159	$724,602

In addition to the benefits from recreational value, there are also the economic benefits associated with storm damage prevention. The value of property that is lost to storm damage has been valued at $34,557 per acre (see Costanza, 2006) and we can use the length of each fill-site along with their increases in beach-width to estimate the number of acres that are restored at each site. Table 28 (above) estimates the value of the storm damage to property that was prevented by the RSBP II nourishments.

Table 29. Summary of Total 5-Year Benefits and Impacts from RSBP II Nourishments

Summary of Total Benefits from RSBP II Nourishments (PDV = 4%)									
Fill Site	Total Benefits	Benefits per cy	Ben./Cost Ratio	Local Spending	State Spending	Local Tax Revenue	State Tax Revenue	SD County Impact	Statewide Impact
Oceanside	$8,742,090	$29.84	1.63	$3,631,516	$4,035,017	$100,875	$464,027	$7,333,359	$8,303,463
N. Carlsbad	$5,942,596	$27.14	1.48	$3,051,519	$3,390,576	$84,764	$389,916	$6,162,133	$6,977,300
S. Carlsbad	$4,720,953	$33.48	1.83	$2,642,042	$2,935,602	$73,390	$337,594	$5,335,249	$6,041,030
Batiquitos	$4,443,128	$41.92	2.29	$2,351,178	$2,612,420	$65,310	$261,242	$4,747,888	$5,375,969
Moonlight	$1,720,085	$18.70	1.02	$1,026,785	$1,140,873	$28,522	$131,200	$2,073,455	$2,347,745
Cardiff	$554,306	$6.23	0.34	$162,427	$180,474	$4,512	$20,755	$327,999	$371,389
Solana	$1,250,655	$8.81	0.48	$755,874	$839,860	$20,996	$109,182	$1,526,385	$1,728,306
Imperial	$4,545,361	$10.10	0.55	$2,685,816	$2,984,241	$74,606	$298,424	$5,423,646	$6,141,121
Total	$31,919,174	$21.26	1.16	$16,307,156	$18,119,063	$452,977	$2,012,340	$32,930,115	$37,286,323

Table 29 (above) combines the benefits from storm damage prevention with the benefits from increased recreational value in order to project the total benefit/cost ratios of the RSBP II nourishments. While the

ratio for each beach is slightly larger than that found in Table 28, the addition of storm damage value was not enough to push the ratios for Cardiff, Solana or Imperial Beach up to 1.00. We can, however, see that the overall benefit to cost ratio for the entire project as a whole is justified at 1.16.

Table 29 also includes the increases to both spending and tax revenue at the local and state levels due to the increased attendance at each beach. Overall, the RSBP II nourishments will contribute an additional $453,000 in tax revenue at the local level and an additional $2.0 million at the state level. In the final two columns respectively show the total economic impact of the RSBP II nourishments upon the businesses of San Diego County and the state of California. Over the 5 years following the nourishments, the project will create $37 million in economic activity within the state.

Conclusion and Limitations of this Study

Overall the project generated $31.9 million in economic benefits yielding a benefit/cost ratio of 1.16. In addition the project generated $32.9 in total economic impact for San Diego County and $37.3 million in total economic impact for the State.

Summary of Total Benefits from RSBP II Nourishments (PDV = 4%)									
Fill Site	Total Benefits	Benefits per cy	Ben./Cost Ratio	Local Spending	State Spending	Local Tax Revenue	State Tax Revenue	SD County Impact	Statewide Impact
Oceanside	$8,742,090	$29.84	1.63	$3,631,516	$4,035,017	$100,875	$464,027	$7,333,359	$8,303,463
N. Carlsbad	$5,942,596	$27.14	1.48	$3,051,519	$3,390,576	$84,764	$389,916	$6,162,133	$6,977,300
S. Carlsbad	$4,720,953	$33.48	1.83	$2,642,042	$2,935,602	$73,390	$337,594	$5,335,249	$6,041,030
Batiquitos	$4,443,128	$41.92	2.29	$2,351,178	$2,612,420	$65,310	$261,242	$4,747,888	$5,375,969
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Cardiff	$554,306	$6.23	0.34	$162,427	$180,474	$4,512	$20,755	$327,999	$371,389
Solana	$1,250,655	$8.81	0.48	$755,874	$839,860	$20,996	$109,182	$1,526,385	$1,728,306
Imperial	$4,545,361	$10.10	0.55	$2,685,816	$2,984,241	$74,606	$298,424	$5,423,646	$6,141,121
Total	$31,919,174	$21.26	1.16	$16,307,156	$18,119,063	$452,977	$2,012,340	$32,930,115	$37,286,323

Limitations

The analysis contained in this report relies primarily on survey data and human counts at specific reaches in order to estimate attendance at those sites. Since sand does migrate to other reaches within the littoral cell, widening those beaches/reaches as well, our estimates of benefits are conservative—they do not account for these benefits.

Two critical factors in estimating benefits are attendance and the duration of increased beach-width at each site. Sites with higher attendance and lower erosion rates post-nourishment (e.g., Moonlight beach) had high benefits relative to cost. Sites with low beach-width retention and fewer people (e.g., Fletcher Cove) had lower benefits. Had the beach-width been maintained longer, the economic benefits would have been *substantially* higher.

References

Costanza, R., Wilson, M., Troy, A., Voinov, A., Liu, S., and D'Agostino, J. (2006). *The Value of New Jersey's Ecosystem Services and Natural Capital*, Gund Institute for Ecological Economics, July 2006.

King, P.G. (2001). "The Demand for Beaches in California," prepared for the California Dept. of Boating and Waterways, Spring 2001.

King, P.G., and Symes, D. (2004). "Potential Loss in GNP and GSP from a Failure to Maintain California's Beaches", *Shore and Beach*, Fall 2004.

King, P.G., w. A. McGregor and J. Whittet, (2009) "The Economic Costs of Sea Level Rise to California Beach Communities," California Resources Agency & Dept. of Boating and Waterways (Refereed through California Ocean Science Trust).

Landry, C. E., Keeler, A.G., and Kreisel, W. (2003). An Economic Evaluation of Beach Erosion Management Alternatives. *Marine Resource Economics* 18: 105-127.

Pendleton, L., King, P.G., Mohn, C., Vaughn, R., and Zoulas, J. (2011). Size Matters: The Economic Value of Beach Erosion and Nourishment in Southern California. *Contemporary Economic Policy* 30:2, 223-237.

San Diego Association of Governments. (2014) SANDAG Regional Beach Monitoring Program, prepared by Coastal Frontiers Corporation.

Appendix I: Implan Overview

Input-Output Analysis

Input-output (I/O) was designed to analyze the transactions among the industries in an economy. These models are largely based on the work of Wassily Leontief. Detailed I/O analysis captures the indirect and induced interrelated circular behavior of the economy. For example, an increase in the demand for health services requires more equipment, more labor, and more supplies, which, in turn, requires more labor to produce the supplies, etc. By simultaneously accounting for structural interaction between sectors and industries, I/O analysis gives expression to the general economic equilibrium system. The analysis utilizes assumptions based on linear and fixed coefficients and limited substitutions among inputs and outputs. The analysis also assumes that average and marginal I/O coefficients are equal.

IMPLAN

IMPLAN is a computer program developed by the United States Forest Service to construct I/O accounts and models. Typically, the complexity of I/O modeling has hindered practitioners from constructing models specific to a community requesting an analysis. Five different sets of multipliers are estimated by IMPLAN, corresponding to five measures of regional economic activity. These are: total industry output, personal income, total income, value added, and employment. Two types of multipliers are generated. Type I multipliers measure the impact in terms of direct and indirect effects. Direct impacts are the changes in the activities of the focus industry or firm, such as the closing of a hospital. The focus business changes its purchases of inputs as a result of the direct impacts. This produces indirect impacts in other business sectors. However, the total impact of a change in the economyA-3 consists of direct, indirect, and induced changes. Both the direct and indirect impacts change the flow of dollars to the state, region, or county's households. Subsequently, households alter their consumption accordingly. The effect of the changes in household consumption on businesses in a community is referred to as an induced effect. To measure the total impact, a Type II multiplier is used. The Type II multiplier compares direct, indirect, and induced effects

Like other input-output models, IMPLAN calculates the flow of payments for goods and services across different industry sectors, and between households and industries. It can be envisioned simply as a table with hundreds of rows and columns, with all industries (plus households) listed down the side as producers; and the same industries (and households) listed across the top as consumers. Spending by any consumer industry is allocated across all of the producing industries and the household sector. Each of these producer industries in turn purchases its own distinct set of inputs from other industries and households in order to produce the output it sells.

Table A1: Economic Multipliers Applied to Hospitals

Type of Multiplier	Direct	Induced	Indirect
Employment	Hospital employees and those providing services directly to hospitals	Retail and Service jobs generated by employee spending.	Jobs created by indirect suppliers of services to hospitals (e.g., ambulance repair service).
Income	Employee/service provider Income.	Retail/Service Income	Supplier income.
Output	Hospital Expenditures	Retail/Service Expenditures	Supplier Expenditures

However, in addition to this direct spending, there are indirect, and induced impacts, often referred to as "multiplier effects." The *indirect impact* is a product of spending by the local, regional or State companies from which the hospital purchases goods and services. The *induced impact* represents the impact of routine household spending by hospital employees – for rent, food, clothing, transportation, etc. – and by the employees of its suppliers. Table A1 above provides an illustration of these multipliers.

Intuitively, if these hospitals close, the region would not only experience an economic contraction due to the loss of wages and services directly paid for by these hospitals, Sonoma County would also lose the spending by hospital employees and other members of the workforce who provide services to hospitals as well as the spending on other industries who provide inputs top these hospitals.

To estimate the interactions of Sonoma County' hospitals with the rest of the region's economy, economists use input/output analysis, which estimates the interactions of different industries as well as additional consumer spending. These interactions vary from industry to industry and region to region. To analyze these impacts, we use *IMPLAN* software[3], which is based on the Bureau of Economic Analysis' Input Output models. The specific data used in this analysis is based on actual data collected by the U.S. Government applicable to San Diego County. This data is run through an input/output model generated in *IMPLAN* software and presented in the tables in this report.

[3] See www.implan.com.

Appendix II: CSBAT Overview

Economic benefits were calculated using a model that Dr. King has developed for the State of California and in conjunction with the State and the U.S. Army Corps of Engineers as part of the Coastal Sediment Management Workgroup (CSMW). Exact details of this model and methodology can be found elsewhere (see King 2009). Briefly, the model applies a benefits transfer model from the Southern California Beach Project and uses local survey data taken at beaches in San Diego County to calibrate changes in various amenities, in particular beach-width, which is a critical part of this analysis. Changes in crowding at beaches (i.e., with the same number of people on the beach a wider beach will be less crowded—measured in terms of square foot of sand per visitor) were also taken into account. Survey data also indicates that people will go to a beach more often if it is wider. This increase in attendance has been accounted for, along with substitution effects. (If they go to one beach more often they also may go to another less often.)

Finally, access and parking were accounted for—beaches with more limited parking relative to attendance (e.g. Mission Beach) had lower estimates of growth in attendance following nourishment. It is important to note that only recreational benefits are estimated in this paper. It is likely that widening beaches at these sites will also create substantial storm damage prevention benefits. The State of California will not fund projects unless benefits occur to the general public at beaches with open access or if the benefits accrue to preserving public property or buildings. Adding sand to these sites would decrease the probability of public (and private) property being damaged in a storm. Thus the (recreational) benefits estimated here should be considered a lower bound, conservative estimate. Adding in storm damage prevention benefits for public property could add significantly to estimated public benefits.

In modeling losses to recreational value following sandy beach erosion, we use a standard model that is reasonably tractable—a benefits transfer (BT) approach, which allows one to apply estimates from previously analyzed sites to similar beaches. In practice, BT is much less expensive than other methods to model(?) and also has the advantage of consistency over space and time. For BT to work properly, consistent methodology must be used to assess the recreational value of a particular beach. This study used the Coastal Sediment Benefits Analysis Tool (CSBAT) to value beach recreation (per user per day). CSBAT uses the following six criteria to assess the recreational value of California beaches:

- Weather;
- Water quality and surf;
- Beach-width and quality;
- Overcrowding;
- Beach facilities and services; and
- Availability of substitutes

The functional form used in the CSBAT analysis is a Cobb-Douglas utility function, of the general form:

Value of a Beach Day = M* $A^a * A_2^b * A_3^c * A_4^d * A_5^e * A_6^f$

Where:

M is the maximum value for a beach day

$A_1 \ldots A_n$ represent each beach amenity (rated on a scale of 0 to 1)

a … f are the weighting of each amenity value

$a + b + c + d + e + f = 1$.

The CSBAT model has been calibrated with data from existing studies. The Cobb-Douglas function exhibits diminishing marginal utility with respect to beach-width. In addition, the model employed in this study caps beach-width benefits at 300 feet. This is consistent with a number of studies indicating that beaches can, in fact, be too wide (Landry et al. 2003). However, wider beaches also diminish crowding, the benefits of which are taken into account in the model.

Appendix III: Survey Administered at RSBP II Sites

[To be filled out by surveyor]

Date/day of week _____ Time_____

Location _____ Surveyor _____ #_____

Activity _____ Comment _____

We are conducting this survey for the San Diego Association of Governments (SANDAG). Our goal is to learn about your motivations for visiting the beach and your perceptions of increases in beach-width. We would appreciate your help by taking a few minutes to complete this survey.

1. How many people **from your household** are in your group today?

❒ 1 ❒ 2 ❒ 3 ❒ 4 ❒ 5-6 ❒ 7-9 ❒ 10 or more

2. What activities are you and people from your household engaging in at the beach today (check as many as relevant)?

❒ Swimming ❒ Surfing ❒ Walking ❒ Sunbathing ❒ Other

3. Please place a check in the appropriate boxes below (one per question).

When did you ARRIVE TODAY?	Before 6 AM	6-10 AM	10 AM-Noon	Noon-2PM	2-2-5 PM	After 5 PM
How long do you plan to STAY TODAY?	Less than 30 minutes	30-60 minutes	1-2 hours	2-4 hours	4-6 hours	More than 6 hours

4. How many days this year will you go to **this beach**?

❒ 1-2 ❒ 3-5 ❒ 6-9 ❒ 10-14 ❒ 15-21 ❒ 21-30 ❒ 30-60 ❒ 61 or more

4a. How many days this year will you go to **other beaches in San Diego County**?

❒ 1-2 ❒ 3-5 ❒ 6-9 ❒ 10-14 ❒ 15-21 ❒ 21-30 ❒ 30-60 ❒ 61 or more

5. Please check the most appropriate box:

❒ I'm here on a day trip. ❒ I'm on a trip/vacation away from my **permanent** residence.

6. How did you get to this Beach **today**?

❒ By Car ❒ By Foot ❒ By bicycle ❒ By Train ❒ Other

7. Examining the beach where you are **right now**, suppose this beach was **HALF** as wide as it is now. How would that effect your number of visits to **this** beach?

❒ Would go about the same amount ❒ Would go somewhat (10%) less often

❒ Would go quite a bit (25%) less often ❒ Would go **half** as much

❒ Would still go, but less than half as much. ❒ Would no go at all

8. Examining the beach where you are **right now**, suppose this beach was **TWICE** as wide as it is now. How would that effect your number of visits to **this** beach?

❒ Would go about the same amount ❒ Would go somewhat (10%) more often.

❒ Would go quite a bit (25%) more often ❒ Would go much often (50% or more)

9. Could you estimate your spending, **per household per day on your current trip** on the following items and the percentage of this spending that occurs in San Diego County? If you spent nothing, please put a **zero** in the box.

Item	**Average amount spent PER Household PER DAY ($US)**
Lodging	
Sit-down Restaurants	
Food from Stores & Take Out	
Gas & Auto (Including Rental)	
Beer, Wine & Liquor	
Parking	
Sundries (Sun Tan lotion,	

books, etc.)	

Demographic Information: It would help us a great deal if you could provide us with some other information about you and your household. All information is confidential.

10. How old are you?

❒ 16-19 ❒ 20-24 ❒ 25-34 ❒ 35-44 ❒ 45-54

❒ 55-64 ❒ 65-74 ❒ 75 or older

11. What is your ethnicity? (Note: you may check **more** than one box here.)

❒ White (Caucasian) ❒ Hispanic ❒ Asian/Pacific Islander

❒ Black (African American) ❒ Other

12. What is your highest level of Education?

❒Less than High School ❒High School/GED ❒ Some College

❒College Degree ❒Post Graduate

13. Including yourself, how many people are in your current household (people you live and share financial resources with)?

❒ 1 ❒ 2 ❒ 3 ❒ 4 ❒ 5-6 ❒ 7-9 ❒ 10 or more

14. What would you estimate is the current yearly income of your entire household (before taxes)?

❒ Less than $9,999 ❒ $10,000-14,999 ❒ $15-24,999
❒ $25-34,999 ❒ $35,000-49,999 ❒ $50,000-74,999

❒ $75,000-99,999 ❒ $100,000-149,999 ❒ $150,000 or greater

Appendix IV: Additional Demographic Data

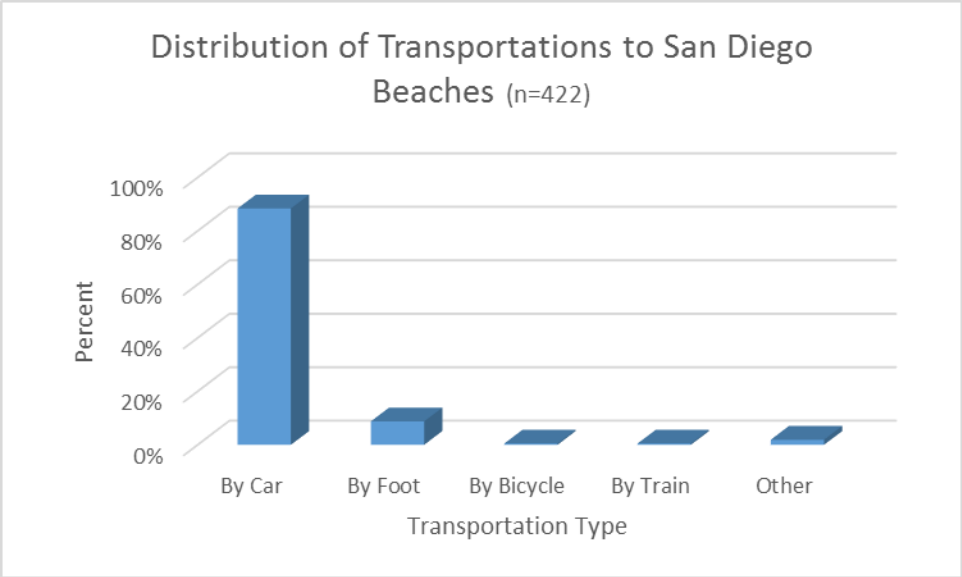

Figure 9. Distribution of Transportations to San Diego Beaches

Our survey also asked respondents, "How did you get to the beach today?" Figure 9 (above) indicates that the strong majority (88%) had driven their cars to the beach that day, while a significant minority (9%) had walked by foot. Only 3% of respondents had traveled by some other means to the beach.

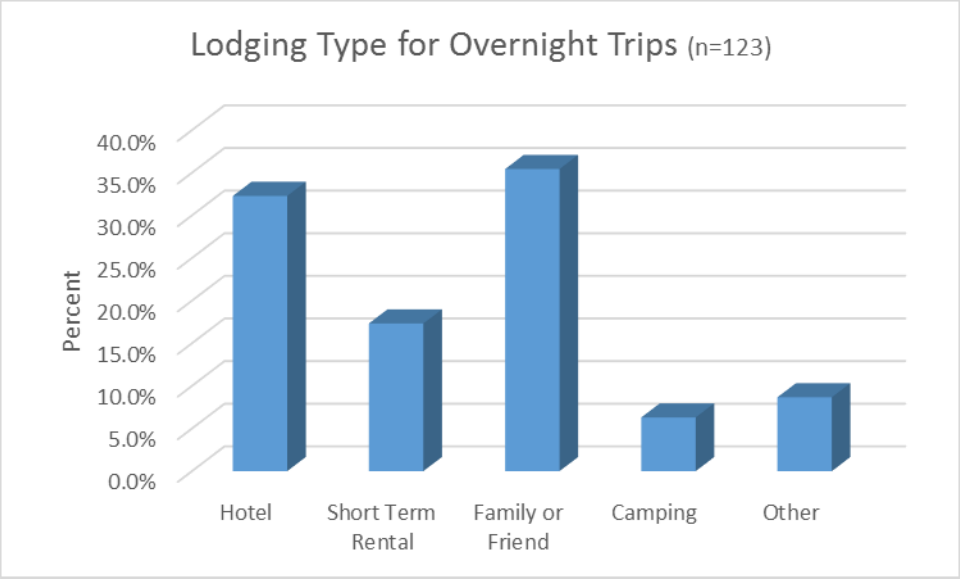

Figure 10. Distribution of Lodging Types for Overnight Trips to San Diego Beaches

Those respondents who indicated that they were staying away from their primary residence overnight were also asked, "What type of lodging will you be using?" Figure 10 (above) illustrates how most respondents indicated that they would either be staying in a hotel (32%) or with a friend or family member (35%). A smaller number said they would be staying in a short term rental (17%), camping (6%) or some other type of lodging (9%).

Table 30. Previous Visits to Other Beaches in San Diego County over the Past 12 Months

Not including this trip, how many days have you visited other beaches in San Diego County over the past 12 months?		
1) 1		
2) 2	Responses:	365
3) 3	Mean answer:	4.7
4) 4		
5) 5		
6) 6-12		
7) 13-51		
8) Once a week		
9) More than once a week		

All respondents were asked, "Not including this trip, how many days have you visited other beaches in San Diego County over the past 12 months?" Table 30 (above) shows that, again, responses varied from 1 ("1") to 9 ("more than once a week") with the mean response being 4.7 with a standard deviation of 2.5. Once again, it should be kept in mind that this was the average response to the survey question and that the average number of annual visits per respondent is likely to be significantly higher than 5.

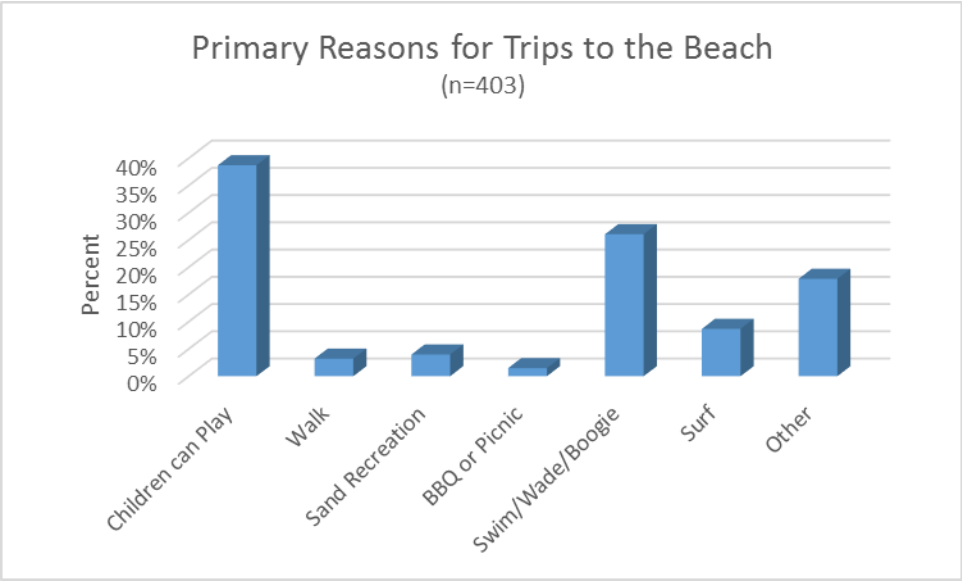

Figure 11. Distribution of Primary Reasons for Beach Trips in San Diego County

Respondents were also asked, "What is the main reason for your trip today (choose one)?" Figure 11 (above) indicates that most popular among the 403 responses were so that children could play (39%) or to swim/wade/boogie board (26%). Less popular responses included surfing (9%), sand recreation (4%), walking (3%) and BBQ or picnic (1%). Another 18% indicated that some other activity was their primary reason for that particular trip to the beach.

Table 31. Distribution of Respondents' Age

What is your age?		
1) 18 to 24		
2) 25 to 34	Responses:	405
3) 35 to 44	Mean answer:	3.3
4) 45 to 54		
5) 55 to 64		
6) 65 to 74		
7) 75 and over		
8) Decline to answer		

Respondents were also surveyed regarding their age. Table 31 (above) shows that while responses varied from 1 ("18 to 24 years") to 8 ("75 years and over"), the average response was slightly above 3 ("35 to 44 years"). Again, it must be kept in mind that this is the average response rather than the average age.

Table 32. Distribution of Respondents' Education

Highest level of education completed (choose only one):		
1) No formal ed.		
2) Elementary/Jr. High	Responses:	404
3) High School	Mean answer:	6.4
4) Vocational		
5) Some College		
6) Associates		
7) 4-yr. College		
8) Graduate School		
9) Decline to answer		

Respondents were surveyed regarding the highest level of education that they have completed. Table 32 (above) indicates that responses varied from 2 ("Elementary/Jr. High") to 8 ("Graduate School") while 5 respondents also choose 9 ("Decline to answer"). The average response was somewhere between 6 ("Associates") and 7 ("4-yr. College").

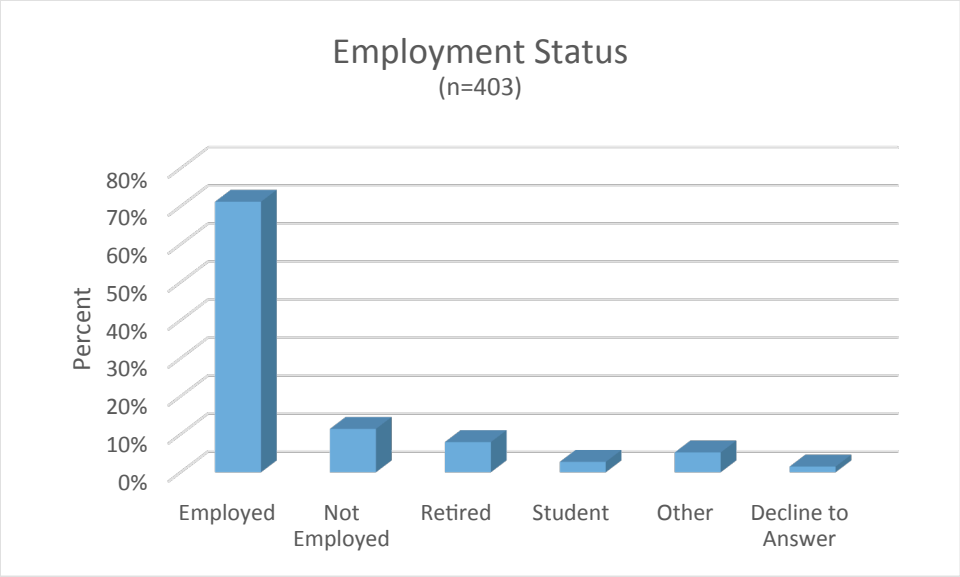

Figure 12. Distribution of Respondents' Employment Status

Respondents were also surveyed regarding their employment status. Figure 12(above) indicates that a strong majority (71%) indicated that they were employed while all other responses (not employed, retired, student and other) were weakly represented (11%, 8%, 3% and 5%, respectively). Less than 2% declined to answer the question.

Table 33. Distribution of Respondents' Household Size

Including yourself, how many people are in your current household?		
1) 1		
2) 2	Responses:	400
3) 3	Mean answer:	3.4
4) 4		
5) 5		
6) 6-7		
7) 8-9		
8) 10 or more		

Respondent were surveyed regarding the size of their current household. Table 33 (above) shows that while responses varied from 1 ("1") to 8 ("10 or more"), the average response was between 3 ("3") and 4 ("4"). Again, this is the average response rather than the average household size. The average household size for the respondents is likely 4 or more. Also, Table 9 ought not to be confused with Table 2 in that the former asks for the size of the household while the latter asks how many within that household was present at the beach that day.

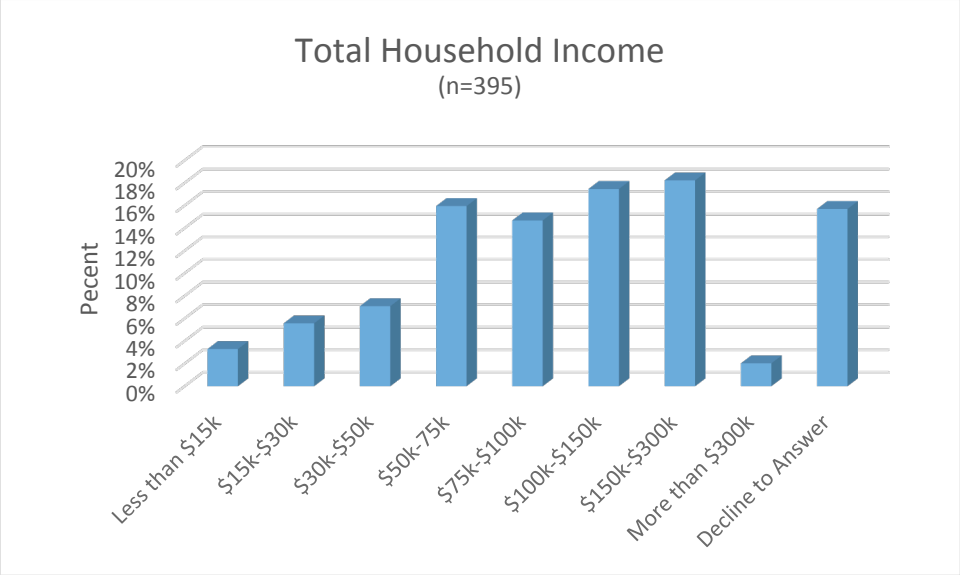

Figure 13. Distribution of Household Incomes

Respondents were surveyed regarding their "total annual household income for the previous year before taxes". Figure 13 (above) indicates that the majority of the 395 responses (66%) were somewhat evenly distributed across the $50k to $300k range. Fewer respondents (a total of 18%) indicated that their total annual household income was less than $50k or greater than $300k. A significant minority (16%) declined to answer the question.