Models For Estimating the Diver Population of the United States: An Assessment

Al Hornsby
Senior Vice President
PADI Worldwide

The Diver Population

- There are differing arguments over what the U.S. diver population is
- But, it is *critical* to have a reasonable population estimate to generate a realistic diver fatality rate

The Diver Population

- Definition of “population” varies
- Arguments most often cited in scientific and medical literature suggest that the dive industry overstates the population
- This presentation will examine:
  - Flawed assumptions of the common “overstated population” arguments
  - An empirically-derived diver population model with independent empirical support

Common “Population is Overstated” Arguments

Argument 1.

- There is an 80% drop-out rate in the first 12 months following initial certification

Argument 2.

- There is significant duplication (“dual certifications”) among diver certifications, which contributes to inflated certification numbers leading to an inflated population estimate

Argument 3.

- Only “active divers” (subject to various minimum numbers of dives per year) should be counted in the diver population

Argument 1: 80% drop-out in the first 12 months

- Argument lacks empirical basis
- It is contradicted by empirically-based studies:
  - DRI 1987 “Diver Erosion Study”
  - D&R 2006 “Profile of the Most Active Divers in the U.S.: Lifestyle and Demographic Study”

Argument 1: 80% drop-out in the first 12 months

- The 1987 DRI study found that divers "drop-out" rates of:
  - 15% after 12 months from certification
  - 23% after 24 months
  - 33% after 36 months
  - 53% after 48 months

Argument 1: 80% drop-out in the first 12 months

- The 2006 D&R study found:
  - Divers have a 5 year half-life
  - Defined as: “50% of the people certified in any given year will have stopped diving by the end of the fifth year.”

Argument 1: 80% drop-out in the first 12 months

- A recent German study (*Tauchsport-Industrieverband (tvi) 2010 "FVSF-Research Report No.31 "Diving in the Future"*) supports these findings
- Found the drop-out rate to be:
  - 10% per annum for divers who do not own gear
  - 8.5% per annum for divers who own gear

Argument 1: 80% drop-out in the first 12 months

- Further to these findings, the 2006 D&R study also found:
  - About 33% of divers surveyed were certified prior to 1995 (10+ years)
  - Divers can be tracked back as far as 20 years
  - Such divers can be considered “vestigial divers”

Argument 1: 80% drop-out in the first 12 months

- Similarly, the 1998 Leisure Trends “Track on Scuba” study found:
  - 14% of the diving population had been diving from 10 to 19 years

Argument 1: 80% drop-out in the first 12 months

Conclusion:

- An 80% year one drop-out rate lacks empirical support and contradicts existing empirical data
- Empirical data point to a sizeable, long-term diver population

Argument 2: “Dual certifications” inflate population estimates

- Lacks an empirical basis
- The DEMA Certification Census provides empirical data that contradict this argument

Argument 2: “Dual certifications” inflate population estimates

- The DEMA Certification Census, 2000-2008:
  - Includes entry-level certification data (by individual name and address) from PADI, SDI and SSI (and formerly included NAUI)
  - A TPA de-dupes all names, between and within participants’ certification lists
  - As published by DEMA, finds an initial duplication rate between participants of approx. 1%

Argument 2: “Dual certifications” inflate population estimates

Conclusion:

- Duplicate (“Dual”) certifications do not appear to exist in sufficient numbers to significantly inflate diver population estimates

Argument 3: Only “active divers” should be counted

- Defining and counting active divers is a valid concept for *certain* purposes
- It is *not valid* for establishing a population as the basis for a fatality rate
  - If a diving participant can be counted as a fatality for rate purposes, the diver *must* also be counted as part of the population
  - All those who participate in diving within the subject year *must* be counted in establishing a rate

Argument 3: Only “active divers” should be counted

- Diver population estimates actually are typically *under*stated through the exclusion of introductory experience participants
- Based upon a 2003 Flexo Hiner & Partners study, PADI Members alone provide introductory experiences to an estimated 225,000 U.S. residents per year
- A fatality rate derived by counting introductory experience fatalities, but excluding the participants from the population, is statistically invalid (over stated)

Argument 3: Only “active divers” should be counted

Conclusion:

- Diver population estimates that count only those divers with some minimum number of dives are not reasonable for use in establishing fatality rates for *all* divers

An Appropriate Model

- Empirically-based
- Supported by independent empirical studies
- Historical consistency

The NUADC-McAniff Model

- Diving's longest term U.S. diver fatality study, 1970-1994
- Diving's longest-term diver population study, for years 1970-1994
- Published an annual fatality report, added retroactive population and fatality rate in 1980
- Original basis for the frequently quoted diver population estimate of 2.7-3.5 million
- Discontinued after DAN absorbed the program

The NUADC-McAniff Model

- Summary of program published in 1995:

"An Analysis of Recreational, Technical and Occupational Populations and Fatality Rates in the United States, 1970-1994"

The NUADC-McAniff Model

- The population estimate was based upon:
  - Ongoing certification data from the certification organizations
  - An early publication, “An Analysis of the Civil Diving Population of the United States”
  - Underwater Society of America membership and insurance data
  - *Skin Diver Magazine* and telephone diver surveys
  - An applied erosion (drop-out) rate

The NUADC-McAniff Model

- In 1995, McAniff applied the DRI erosion curve to his model
- His model's original estimate fit within the new range
- The population estimate was established at 2.7-3.5 million

The NUADC-McAniff Model

- Independent diver population studies continue to support McAniff's diver population estimate:
  - National Safety Council 1991 "Accident Facts" – 2.6 million
  - NSGA 1994 "Sports Participation Study" – 2.378 million (excludes Alaska and Hawaii)
  - NSGA 1998 "Sports Participation Study" – 2.558 million

The NUADC-McAniff Model

- Supporting studies (continued):
  - American Sports Data, Inc. 1999 “Super Study of Sports Participation” – 3.2 million
  - Media Mark Research, Inc. 1999 “MRI Sports Trends: Total Scuba Diving Participation” – 2.5 million
  - SGMA 2006 “USA Sports Participation Study” – 2.96 million
  - SGMA 2008 “USA Sports Participation Study” – 3.216 million

The NUADC-McAniff Model

- Status of the NUADC-McAniff Model Since 1995:
  - Discontinued after 1995
  - Ongoing empirical studies continue to support its findings
  - Ongoing diver certification data since 1994 suggest the present diver population remains consistent with the model's population range

Conclusions

- Arguments that the industry's dive population estimate (based upon the NUADC-McAniff model) is overstated appear to lack empirical support
- The NUADC-McAniff model estimates are empirically based and supported by independent, ongoing research
- It appears that the model's estimate remains the most suitable figure for scientific and medical studies requiring a U.S. diver population estimate
- It appears that an effort to update the NUADC-McAniff model would be a worthwhile approach in deriving an accepted diver population estimate – and fatality rate – for the U.S.