Communicating to Recruit the Best New Biologists: A Survey for SEAFWA

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Abstract: Graduates from fisheries and wildlife programs in the Southeast need to know what qualifications are necessary to successfully attain entry-level biologist positions with state agencies, and state agencies and university programs share a responsibility for preparing students for these positions. Despite much literature devoted to the discussion of what should be included in academic curricula, little work has been done to identify how agencies are communicating with students and what types of experiences will best prepare potential applicants for employment with these agencies. We used Internet survey responses from professionals in 15 member agencies of the Southeastern Association of Fish and Wildlife Agencies (SEAFWA) to determine their recruiting and hiring processes. In general our survey results indicated that professionals from SEAFWA agencies are communicating with universities by offering students seasonal employment, encouraging student volunteers, and facilitating low cost workshops for students. However, efforts by agency biologists to participate in student recruitment and education were often not included in their annual performance reviews. Hiring processes varied among these agencies, but often included an online component. We surveyed both human resources (HR) professionals and biologists within agencies and found that they did not differ in their assessment of the qualifications necessary for position vacancies, nor did they differ in their ratings of importance/satisfaction of 11 different areas of coursework for recent graduates from university fish and wildlife programs. All respondents rated communication skills of recent graduates as most important, yet they were least satisfied in this area. A Master of Science degree and effective communication skills were considered to be essential for entry-level biologist positions. Based on our results, it is important for faculty and students to place more emphasis on developing effective communication skills. Furthermore, agencies will likely recruit and retain the best new employees if they strive to improve intra-agency communication and consistency in the hiring process, as well as help facilitate continuing education opportunities.

Key words: education, employment, experience, fieldwork, internship, recruitment, students

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Effective, two-way communication between universities and fish and wildlife agencies is necessary to produce the most qualified fish and wildlife biologists (Bleich and Oehler 2000, Miller 2000, Lopez 2001, Powell et al. 2009). Agencies should inform university fish and wildlife programs of their expectations, and these academic programs should collaborate with agencies when evaluating curricula to best incorporate their expressed needs and concerns (Miller 2000, Scalet 2007). The complexity of the fish and wildlife profession makes it nearly impossible for universities to produce "the complete" biologist in four years; therefore, it is often necessary to prioritize the education and experiential background required for agency positions. Furthermore, agencies must recognize the need for individuals to pursue opportunities to continue their education after they begin their employment (Miller 2000).

There is currently debate over whether or not today's fish and wildlife curricula should increase scientific rigor, maintain strong technical skills, focus on natural history, and include new topics such as human dimensions and training in geographic information systems (Bleich and Oehler 2000, Brown and Nielson 2000, Lopez 2001, Scalet 2007, Millenbah and Wolter 2009). Agency biologists and administrators, faculty members, and students have offered the following suggestions on how agencies and universities can improve the preparation of students for entry-level wildlife careers: (1) establish internships, cooperative education programs, work-study programs, and temporary positions (Schmidly et al. 1990, Matter and Steidl 2000, Miller 2000, Lopez 2001); (2) interact with and mentor students through the sponsorship of undergraduate research, workshops, and professional societies (Matter and Steidl 2000, Lopez 2001); (3) develop orientation or training programs for newly employed biologists (Matter and Steidl 2000, Miller 2000); (4) examine the professional/continuing education needs for biologists and work together to provide additional continuing education through workshops, conferences, certification programs and additional degrees (Schmidly et al. 1990, DeMillo et al. 1998, Brown and Nielson 2000, Krausman 2000, Matter and Steidl 2000, Miller 2000, Lopez 2001); (5) establish entry-level standards for biologists such as adopting The Wildlife Society (TWS) or American Fisheries Society (AFS) certification requirements (Miller 2000, Kroll 2007); (6) develop a strategic agency plan and share it with universities (Miller 2000); and (7) maintain commu-

nication between employees and stakeholders about expectations and future needs of the agency (Miller 2000). One method for enhancing communication is for agencies to participate in university fish and wildlife curriculum reviews (Matter and Steidl 2000).

Ineffective communication between universities and fish and wildlife agencies can also cause students to receive conflicting information about how best to prepare for careers as fisheries and wildlife biologists. Students are frequently told that in addition to academics, experience is vital to gaining entry-level employment (Powell et al. 2009). Lopez (2001) recommended that students pursue a graduate degree, get involved in professional organizations, and pursue field experience outside the classroom through volunteer work, summer internships, or state-federal co-op programs.

Whereas existing literature recommends different strategies for fish and wildlife agencies to increase communication with prospective applicants, there has been little follow-up to determine current agency practices. There also has been no study designed to determine which experiences are most valuable to a student's education in terms of improving their resumes and making them more competitive for employment. Therefore, the objectives of our study were to (1) determine how the member agencies of SEAFWA are communicating with future wildlife and fisheries professionals, (2) gather details regarding the hiring processes specifically used by member agencies of SEAFWA, and (3) rate the importance of the different types of job qualifications students typically have when they complete undergraduate-level university natural resource programs in the Southeast.

Methods

We developed questions following survey design recommendations from Dillman (2007). Most questions were structured for binomial responses (e.g., "Yes" or "No") or Gutman scale rankings of 1 to 4 (e.g., 1 = "Not Important"; 4 = "Very Important"); few items were left open-ended so as to limit the time required to complete the survey. Considering the budgetary effects of the 2008–10 economic recession, respondents were specifically asked to consider their agency's activities and hiring processes related to hiring for entry-level biologist positions during the prior five years when answering the questions. We did not include questions pertaining to law enforcement positions in this survey.

The questionnaire had three sections. Section 1 focused on student opportunities within the agency (e.g., state-sponsored internship programs, seasonal employment, cooperative-education positions). We asked agency personnel whether they encouraged student volunteers at agency events; assisted with student research projects or service learning opportunities; offered low-cost workshops to undergraduate fisheries and wildlife students; participated in curriculum reviews; and whether they interacted with university fisheries and wildlife programs by speaking at meetings of student chapters of TWS or AFS, guest lectured in classrooms, or participated in curriculum reviews.

Section 2 of our questionnaire concerned the hiring process specific to SEAFWA agencies (e.g., whether they employed a recruiter or HR professional to work with applicants for natural resource positions, how they advertised vacant positions, detailed questions regarding the application process, the format typically used for interviews). We asked respondents to rank from 1 to 4 (i.e., 1 = "Not Important"; 4 = "Very Important") several factors that influenced their decision to hire a candidate (e.g., attire, verbal communication, eye contact, fidgeting, written communication, letters of recommendation, and personal references) and for advice they would give to students applying for positions within their agency.

In Section 3, we asked respondents to rank from 1 to 4 specific qualifications of recent graduates from fisheries and wildlife programs in the Southeast (e.g., Bachelor of Science degree that meets the educational requirements for TWS or AFS certification, a Master's degree in the field of natural resources, a Master of Science degree in fisheries or wildlife, participation in an official internship program, employment in a seasonal fisheries or wildlife position, service learning or management projects for clients, workshops such as Becoming an Outdoors Woman [www.uwsp.edu/cnr/bow] or Conservation Leaders for Tomorrow [clft.org], membership in professional organizations, and wildlife- or fisheries-related volunteer work). We also asked respondents to rank the importance of several subject areas (i.e., communication skills, game management, geographic information systems, ecological theory, forest management, human dimensions, mathematics and statistics, natural history, natural resource policy, non-game and endangered species, and technical/mechanical experience) to a student's qualifications, as well as their satisfaction with student competency in these subject areas in regard to positions they filled during the last five years.

A draft copy of our survey was presented during the SEAFWA Board of Directors meeting in Atlanta, Georgia on 3 November 2009. Two follow-up emails were sent after this meeting to facilitate agency participation. SEAFWA directors were asked to provide feedback on the survey questions, contact information of those professionals within their respective agency that they preferred to participate in the survey, and to alert these individuals of the coming survey. This procedure was intended to ensure those personnel actually involved in the hiring process were contacted, to enhance the rate of survey completion, and to avoid potential negative responses associated with receiving a "blind survey" request (Cho and LaRose 1999).

Target participants were state agency fisheries biologists, wild-

life biologists, and human resource professionals with hiring authority. SEAFWA directors provided us an initial list of 25 contacts from 15 member agencies. These individuals were emailed a description of the project along with a draft of the questionnaire. They were given time to review the questionnaire and make suggestions, and (if we did not already have at least three participants identified from their state) asked to identify other professionals from their agency to participate in the survey. Despite multiple attempts, we did not receive responses the Puerto Rico Department of Natural Resources or the Virgin Islands Department of Natural Resources.

Survey questions were modified based on feedback we received. The final questions were used to create an Internet survey using Zoomerang Internet survey software (www.zoomerang.com/online-surveys). We pilot-tested the Internet survey for ease of completion during December 2009. An email containing the survey link was then sent to 30 agency professionals in January 2010. If we had fewer than three professionals identified to represent each agency, then we asked the recipient to forward the email and survey to another appropriate individual in the same agency. Ultimately, our questionnaire was sent to 45 individuals. Survey reminders were sent to non-respondents two and four weeks after the initial survey launch.

Survey response data were downloaded into Statistical Package for Social Sciences version 16 (SPSS 2008) for analysis. We used a bivariate comparison using chi-square analysis to determine whether agency HR professionals differed from agency biologists in their responses to all three sections of our survey. If there were no significant ($P < 0.05$) differences, then we pooled data from HR professionals and biologists to calculate an overall mean rating of importance and satisfaction for survey responses. We conducted a separate Chi-square analysis to contrast the importance of a recommendation letter versus a personal phone call from an applicant.

We received a total of 38 completed surveys representing 15 SEAFWA agencies from Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia and West Virginia. Survey participants included 13 wildlife biologists, 12 fisheries biologists, and 12 HR professionals. Given the variability in biologist positions among SEAFWA agencies, we could not separate fisheries and wildlife biologists for statistical tests. Therefore, survey data from wildlife and fisheries biologists were combined to represent "agency biologists." One survey participant did not provide the necessary information to be assigned to a particular participant group, but his/her responses were included where appropriate in our analysis of data. Individuals wishing to receive a copy of our final survey or a summary of state-by-state responses to the survey items should send a request to the senior author (esaunders@warnell.uga.edu).

Results

Student Opportunities within Agencies

Most SEAFWA agencies (13 of 15 surveyed) offered seasonal employment to students. Conversely, official, state-sponsored internship programs were only offered by six SEAFWA agencies. Those agencies that hired students for seasonal employment or as interns reported hiring almost twice as many of them during the summer as compared to spring and fall semesters. SEAFWA agencies reported that most students hired as interns or for seasonal positions were enrolled as fisheries or wildlife majors (75.7%). Only one respondent (Mississippi) reported offering full-time, cooperative-education positions to fisheries and wildlife students who alternated semesters of full-time work with semesters of academic coursework. Of all respondents, 29 (76%) reported their agencies encouraged student volunteers at agency events, three (8%) reported their agencies did not, and six respondents (16%) were unsure. Most respondents (68%) said their agency worked with students on research projects such as senior thesis, honors thesis, or other capstone courses; 13% did not, and 18% were unsure. Slightly fewer respondents (53%) said their agency worked with students on service-learning projects; 13% did not, and 34% were unsure.

At least one respondent from all agencies surveyed reported that their agency facilitated low-cost workshops specifically to encourage wildlife and fisheries students to gain agency experience; however, discrepancies existed in that 42% of respondents within the same agencies reported no workshops were offered. Workshops referenced included: Becoming an Outdoors-Woman, Conservation Leaders for Tomorrow, Project WILD, Fishing in Neighborhoods, Take-One Make-One, Kids Fishing Days, Shotgun Training and Education Program (STEP), and multiple training clinics in areas such as fishing, canoeing, birding, and shooting. Agency professionals also reported participating in youth hunts, Envirothon competitions, AFS and TWS events and student colloquia, in addition to traditional career fairs. Nearly all respondents (35 of 38) stated that they guest-lectured to university classes or to student chapters of TWS or AFS. Of these, 17 (50%) reported these interactions occurred two-three times per year; 12 (35%) reported six or more times per year. Only respondents from two state agencies (Alabama and Mississippi) reported these interactions with student organizations were included as part of annual staff performance evaluations. Seven agencies and 71% of respondents said that these interactions were not included as part of performance

evaluations. When asked why, respondents reported that these interactions were "random and outside normal duties"; "not a routine occurrence"; "voluntary and often done on employee's own time"; "not part of any job description"; "performance evaluations only cover major job responsibilities"; and "evaluations can only be based upon specific duties within the scope of the job description."

Twenty respondents (53%), representing 14 of 15 state agencies, reported participating in curriculum reviews of university wildlife and fisheries programs through alumni meetings or other interactions with academic programs. When considering training for employees, responses were not standard for all state agencies. Only three agencies consistently reported that they require organized formal training for new hires in the field; two agencies responded they did not, and responses from 10 agencies were varied. When asked if their agency required continuing education for natural resources employees, 74% of respondents said their agency did not require continuing education; all respondents from one state (Alabama) reported "Yes"; eight agencies said they did not require continuing education, and six agencies responded both ways.

The Hiring Process

When asked if their agency actively recruits students for fisheries and wildlife positions, respondents from nine agencies reported "Yes," and six agencies reported both "Yes" and "No." Five agencies employed a recruiter or HR professional specifically to work with applicants; two agencies did not, and respondents from eight agencies provided both "Yes" and "No" responses. Respondents reported using multiple media outlets to advertise vacancies, including the state website (92%), agency website (71%), professional society site (63%), via email listserv within agency (58%), via emails sent to schools and colleges with wildlife and fisheries programs (50%), posted on online job boards (47%), and one respondent reported utilizing social networking sites (e.g., Facebook, Twitter). Other methods included contacting college professors, other state agencies, professional organizations, qualified conservation organizations, and newspapers.

Seven agencies reported their application process was entirely online; four agencies reported their process was not entirely online, and four agencies provided mixed responses. Of those that reported their application process was entirely online, 52% encouraged applicants to forward a resume or application packet to their office in addition to filling out the online application.

SEAFWA agencies reported that individuals applied through their state's website ($n = 7$), their agency's website ($n = 5$), or both websites ($n = 3$). We received 18 responses from the seven states that required applications through their state's website. Of these, 10 said that a natural resources professional assessed the qualifications of each applicant and selected candidates to interview; seven said that an HR person performed this task and five reported "other" (respondents could select more than one answer). Those that selected "other" reported that HR professionals selected all minimally qualified applicants, and then biologists or hiring managers determined who to interview.

Twenty respondents reported that their agency required applications through an agency website. Of these, seven stated that an HR professional forwarded all applications to their agency or division to make interview selections; three said this task was performed by a state-level HR professional, and two stated that both an HR-automated system and HR professional performed this task. Four others also reported using an HR-automated system, but that a natural resource professional then determined which candidates to interview. One state agency required applicants to register on a roster with the state division of personnel, after which the division then determined the top candidates and sent the agency a list of 10–15 applicants. Agency professionals then selected the candidates to interview.

Respondents from four state agencies (Louisiana, Mississippi, Oklahoma, and Tennessee) reported using a standardized test to evaluate applicants and that applicants needed to obtain a minimum score to be considered for an interview; however, applicants were allowed to retake the exam. One respondent explained, ". . . minimum qualifications are evaluated, then a written exam and supplemental application are completed. The employment register is established and a score is assigned to each applicant. Candidates are then interviewed based on their rank order."

Respondents reported that applicants were first interviewed by either a team of natural resource professionals that included the position's supervisor (53%), a team consisting of at least one HR professional and one natural resource professional (24%), a team of natural resource professionals that did not necessarily include the position's supervisor (e.g., search committee) (16%), or the direct supervisor for the position (8%). Approximately 70% of respondents reported that most of the interview was based on specific wildlife or fisheries management and ecology knowledge. One respondent said 100% of the interview was based on specific wildlife or fisheries knowledge.

Among the different factors that often influenced the decision to hire a candidate, communication skills were ranked the highest—both for verbal ($\bar{x} = 3.68$) and written communication skills ($\bar{x} = 3.42$). Other factors that influenced potential employers included eye contact ($\bar{x} = 2.89$), attire ($\bar{x} = 2.65$), and distracting behavior ($\bar{x} = 2.46$). All agency professionals reported that they personally contacted references when evaluating an applicant. In terms of recommendations, a personal phone call or contact on be-

half of an applicant was considered equally as important ($\bar{x} = 2.89$) as a letter of recommendation ($\bar{x} = 2.50$) ($\chi^2 = 7.66$, $P = 0.264$). Most respondents (68%) reported that a reference from someone they knew was more valuable than a reference from someone they did not know.

Respondents advised students applying for positions to be thorough and follow instructions carefully when filling out applications and to list all experience, interests, education, and proof-read all information carefully. Specific suggestions included, "remember that your application represents you, so ensure it's clear and error free"; "fill out the application completely instead of putting 'see resume' on the applications"; and "do not assume that your resume or application is adequate or has even been seen by the interview panel." Several respondents encouraged students to: "ask questions, especially when they don't know how to proceed in the application process"; and "research the agency, and contact the agency as much as possible, either in phone, in writing or in person." Suggestions also included that students should "communicate with the supervisor prior to the interview so they fully understand the job and its challenges"; and "be sure to become familiar with the position description." Agency professionals also recommended applicants: "dress for the interview, not the job you are interviewing for"; and be "punctual, courteous, well dressed and exhibit some self confidence without being over confident." One respondent even advised that students "Don't give up!"

Student Qualifications

Three respondents (8%), including one fisheries biologist and two HR professionals, were not aware of TWS's Certified Wildlife Biologist Program; four respondents (11%), including two wildlife biologists and two HR professionals, were not aware of AFS's Certification Program for Fisheries Professionals. Fifty percent of respondents were aware of the Southeastern Section of TWS's (SE-TWS) Graduate Wildlife Program Accreditation. Overall, 51% of agency professionals said they prefer a one-page resume over a multiple page curriculum vitae (CV). Considering only agency biologists, 50% preferred the one-page resume and 50% preferred a CV. In terms of volunteer experience, 54% of respondents reported that unpaid experiences were just as valuable as paid experiences.

There were no significant differences between the rankings of HR professionals or biologists in terms of student qualifications or the importance of and satisfaction with several different academic skill sets (Tables 1–3). Respondents ranked a Master of Science degree in wildlife or fisheries the highest ($\bar{x} = 3.32$) when considering the importance of different qualifications an applicant could have when applying for entry-level wildlife or fisheries biologist positions, followed by a Bachelor of Science degree that meets certification requirements for TWS or AFS ($\bar{x} = 3.16$), and a Master of Science from an institution that meets SE-TWS Graduate Wildlife Program Accreditation standards ($\bar{x} = 3.05$; Table 1). All respondents ranked communication skills as important or very important ($\bar{x} = 3.63$), yet these respondents were less satisfied with the actual communication skills of recent employees ($\bar{x} = 2.71$). This disparity between importance and satisfaction for communication skills was the greatest we observed for all responses (Tables 2 and 3). Importance also was ranked slightly higher than satisfaction for coursework in game management, mathematics and statistics, and technical/mechanical experience, GIS, human dimensions, forest management, and natural resource policy; however, satisfaction was ranked higher than importance for coursework in natural

Table 1. Importance of applicant experience, by agency biologist and human resources personnel.

	Percent of responses											
	Not important		Somewhat important		Important		Very important				Overall importance rating[b]	
Experience	Biol. (%)	HR (%)	Biol. (%)	HR (%)	Biol. (%)	HR (%)	Biol. (%)	HR (%)	χ^{2a}	P^a	$\bar{X}$	SD
MS wildlife and/or fisheries	0.0	0.0	12.0	8.3	44.0	50.0	44.0	41.7	0.16	0.92	3.32	0.66
BS, meets TWS or AFS certification	8.0	0.0	24.0	8.3	24.0	41.7	44.0	50.0	2.93	0.40	3.16	0.92
MS from institution w/ graduate accreditation	8.0	8.3	16.0	25.0	28.0	41.7	48.0	25.0	1.87	0.59	3.05	0.96
Non-thesis master's degree (natural resources)	8.3	0.0	20.8	16.7	58.3	58.3	12.5	25.0	3.05	0.38	2.86	0.75
Volunteer experiences (wildlife/fisheries)	4.0	8.3	44.0	41.7	44.0	41.7	8.0	8.3	0.30	0.96	2.55	0.72
Seasonal wildlife/ fisheries work	16.0	0.0	32.0	66.7	44.0	25.0	8.0	8.3	4.95	0.18	2.45	0.80
Membership in professional organizations	12.0	8.3	48.0	50.0	24.0	41.7	16.0	0.0	2.88	0.41	2.42	0.83
Co-op with w/natural resource agency	16.0	16.7	40.0	50.0	44.0	25.0	0.0	8.3	3.05	0.38	2.29	0.77
Official internship	29.2	8.3	45.8	50.0	20.8	41.7	4.2	0.0	3.34	0.34	2.14	0.79
Service-learning or management projects	36.0	25.0	36.0	50.0	28.0	25.0	0.0	0.0	0.72	0.70	1.97	0.79
Workshops	16.0	25.0	72.0	66.7	12.0	8.3	0.0	0.0	3.34	0.34	1.95	0.57

a. χ^2 statistic and P value for differences in responses from biologists vs. HR professionals

b. Pooled mean for both biologist and HR responses (1 = Not Important, 2 = Somewhat Important, 3 = Important, 4 = Very Important)

Table 2. Importance of academic coursework by agency biologists and human resources personnel.

	Percent of responses											
	Not important		Somewhat important		Important		Very important				Overall importance rating[b]	
Coursework	Biol. (%)	HR (%)	Biol. (%)	HR (%)	Biol. (%)	HR (%)	Biol. (%)	HR (%)	X^{2a}	P^a	$\bar{X}$	SD
Communication skills	0.0	0.0	0.0	0.0	32.0	41.7	68.0	58.3	0.33	0.56	3.63	0.49
Game management	12.0	0.0	0.0	0.0	44.0	66.7	44.0	33.3	2.48	0.29	3.24	0.82
Mathematics and statistics	0.0	0.0	24.0	33.3	48.0	58.3	28.0	8.3	1.88	0.39	2.95	0.70
Technical/mechanical experience	0.0	0.0	16.0	16.7	68.0	83.3	16.0	0.0	2.18	0.34	2.95	0.52
Natural history of regional species	8.0	16.7	28.0	8.3	52.0	58.3	12.0	16.7	2.21	0.53	2.71	0.84
Geographic Information Systems	8.0	0.0	36.0	41.7	48.0	33.3	8.0	25.0	3.17	0.37	2.66	0.78
Ecological theory	12.0	0.0	28.0	58.3	40.0	25.0	20.0	16.7	3.98	0.26	2.66	0.88
Non-game and endangered species	4.0	8.3	36.0	16.7	60.0	58.3	0.0	16.7	5.47	0.14	2.66	0.67
Human dimensions	8.0	0.0	36.0	33.3	48.0	58.3	8.0	8.3	1.15	0.77	2.63	0.71
Forest management	24.0	0.0	20.0	33.3	44.0	50.0	12.0	16.7	3.67	0.30	2.58	0.92
Natural resource policy	4.0	8.3	48.0	16.7	44.0	66.7	4.0	8.3	3.48	0.32	2.58	0.68

a. χ^2 statistic and *P* value for differences in responses from biologists vs. HR professionals
b. Pooled mean for both biologist and HR responses (1 = Not Important, 2 = Somewhat Important, 3 = Important, 4 = Very Important)

Table 3. Satisfaction with academic coursework by agency biologists and human resources personnel.

	Percent of responses											
	Not satisfied		Somewhat satisfied		Satisfied		Very satisfied				Overall satisfaction rating[a]	
Coursework	Biol. (%)	HR (%)	Biol. (%)	HR (%)	Biol. (%)	HR (%)	Biol. (%)	HR (%)	X^{2a}	P^a	$\bar{X}$	SD
Communication skills	8.7	0.0	17.4	25.0	52.2	66.7	21.7	8.3	5.24	0.16	2.71	0.57
Game management	0.0	0.0	16.7	25.0	79.2	75.0	4.2	0.0	2.39	0.50	2.86	0.76
Mathematics and statistics	0.0	0.0	20.8	33.3	75.0	58.3	4.2	8.3	0.80	0.67	2.84	0.44
Technical/mechanical experience	0.0	0.0	30.4	33.3	69.6	58.3	0.0	8.3	3.33	0.34	2.68	0.71
Natural history of regional species	4.0	0.0	16.0	50.0	76.0	50.0	4.0	0.0	2.09	0.35	2.72	0.51
Geographic Information Systems	0.0	8.3	20.8	33.3	79.2	58.3	0.0	0.0	5.07	0.17	2.65	0.67
Ecological theory	4.2	16.7	29.2	8.3	62.5	66.7	4.2	8.3	1.07	0.59	2.81	0.52
Non-game and endangered species	8.3	0.0	37.5	16.7	48.5	83.3	8.3	0.0	2.98	0.23	2.70	0.52
Human dimensions	9.1	8.3	59.1	25.0	27.3	66.7	4.5	0.0	1.81	0.40	2.27	0.56
Forest management	0.0	8.3	60.9	50.0	39.1	41.7	0.0	0.0	5.40	0.15	2.40	0.70
Natural resource policy	8.3	0.0	66.7	58.3	25.0	41.7	0.0	0.0	2.09	0.35	2.39	.55

a. χ^2 statistic and *P* value for differences in responses from biologists vs. HR professionals.
b. Pooled mean for both biologist and HR responses (1 = Not Important, 2 = Somewhat Important, 3 = Important, 4 = Very Important)

history of regional species, ecological theory and non-game and endangered species (Tables 2 and 3). Overall satisfaction rankings were lowest for human dimensions ($\bar{x} = 2.27$), natural resource policy ($\bar{x} = 2.39$) and forest management ($\bar{x} = 2.40$).

Discussion

Student Perspectives

Students wishing to pursue entry-level biologist positions in member agencies of SEAFWA need to consider obtaining higher levels of education, particularly a Master of Science degree, in addition to gaining relevant experience. Professional fisheries and wildlife degrees, even those that meet the requirements for AFS or TWS certification, may not meet the basic requirements for entry-level biologist positions.

Survey responses confirm the need for students to increase communication with agency professionals, especially those interested in future employment opportunities. Because application procedures vary by agency, students should try to become familiar with the application processes of the agencies to which they are applying. Most importantly, students should not be shy about contacting agency professionals with questions regarding available positions or the hiring process. Agency professionals encouraged applicants to be thorough and follow instructions carefully. Our results show that good communication skills are a valuable

asset to any applicant, and students can demonstrate these skills throughout the application process by contacting the appropriate personnel to confirm application procedures and position expectations. Agency professionals often have differing preferences for resume/CV length or reference format, so students should contact the open position's supervisor to identify their preference.

Agency Perspectives

Responses to several of our questions differed between biologists and HR professionals; however, these differences were not statistically significant. For example, 16.7% of HR professionals thought coursework in non-game and endangered species was very important compared to 0.0% of biologists (Table 2). In addition, all of the respondents (24%) who rated forest management as "not important" were fisheries biologists (Table 2). The lack of statistical significance between biologists and HR professionals could be the result of our small sample size; with more responses, these potential differences could become significant.

Of more concern were conflicting answers regarding the question "Does your agency employ a recruiter or HR professional to work with applicants applying for natural resource positions within your agency or division"? Respondents from eight state agencies reported both "Yes" and "No" responses, which suggests that many employees do not know that their agency has a specific contact for potential applicants, and that they could help students obtain important information by putting them in touch with the correct individual. Even if one division in a state agency has a recruiter and another division does not, the implication is that the entire agency may not be operating under the same procedures. Miller's (2000) recommendation to develop a strategic agency plan may help in this area. Agencies should identify specific recruiting and education goals and encourage all agency professionals to be aware of those objectives. A strategic plan that incorporates recruitment objectives will also encourage agency personnel to consistently maintain relationships with university programs and encourage opportunities for professional-student interactions.

State agencies need to make recruitment a priority in order to maintain a pool of applicants to replace future retirees. Our results suggest that many of the recommendations offered by biologists, faculty, and students to increase communication between state agencies and wildlife programs are currently in practice, but to varying degrees within each state agency. In many instances, agencies are making strides to communicate with students through internships, seasonal positions, and speaking engagements; however, agency administrators may need to improve consistency within the agency. Most of our survey participants were identified by the director of each SEAFWA agency with the expectation that those individuals would be knowledgeable about standard agency practices. When answering the same question, multiple respondents from the same agencies often answered differently. We offer a few explanations for why this has occurred: (1) agencies have many different divisions or sections that are managed separately; (2) agency employees are held to standards defined strictly by their position description, which does not include "big picture" responsibilities such as assisting with recruitment; and (3) opportunities for continuing education or agency orientations are extremely limited. Regardless of the reason, improving intra-agency communication is extremely important, and will maximize recruitment opportunities. If a state agency offers an official internship program, yet an agency employee incorrectly tells a student that their agency offers no such program, both the agency and the student could miss out on a mutually beneficial opportunity. Students are likely to trust agency professionals with whom they are in communication.

One of the most consistent recommendations offered to improve the skills of entry-level employees would be to incorporate professional/continuing education for biologists through workshops, conferences, certification programs, and additional degrees (DeMillo et al. 1998, Brown and Nielson 2000, Krausman 2000, Matter and Steidl 2000, Miller 2000, Lopez 2001, Schmidly et al. 1990), yet this advice seems to be most often ignored. Encouraging continuing education could be especially helpful in those areas where agency professionals are reporting lower satisfaction with recent hires. Despite the benefits, 74% of respondents reported that their agency does not require continuing education. We wonder if agencies are requiring more education before the start of a career to substitute for a lack of continuing education throughout a biologist's career. Students enrolled in professional wildlife and fisheries programs expect to qualify for entry-level positions upon graduation (Schmidly et al. 1990, Adelman et al. 1994), but currently a master's degree is the typical entry-level credential (TWS 2009). This trend is supported by our study in which agency professionals ranked a Master of Science degree as the most important qualification for students. Agencies should support a culture of continued learning, rather than expecting students to obtain increasingly higher levels of education before beginning their careers. In addition to encouraging continuing education, we recommend supervisors include recruiting and outreach activities in their employee's annual performance evaluations because these efforts are important to attracting quality applicants and educating students and universities about agency needs.

Donovan and Garrett (2006) found that some states are still offering active and organized internship programs despite budgetary restrictions. Programs that were the most successful at attracting top quality applicants were well-organized and included

established standards and procedures, maintained close ties with university programs, and compensated their interns with wages or stipends. Our findings agree with Donovan and Garnett's (2006) recommendation that state governments continue to formalize and invest in their internship programs, so that state governments can effectively and efficiently recruit new employees with the skills and knowledge necessary to serve the public good.

We recognize the fiscal and human resource limitations faced by state agencies; however, improving internal communication and consistency in the hiring process and continuing education will enable agencies to attract and retain the best-qualified applicants. Maintaining an adequate workforce will be difficult as state governments face an impending personnel crisis. Carroll and Moss (2002) found that state governments are facing a widespread state employee worker shortage as a result of increasing rates of retirement, the composition of current state workforces, and budgetary constraints. They recommend that state governments share their innovative approaches to strengthen the workforce as a whole, and suggest that SEAFWA agencies have a unique opportunity to work together and share strategies that will assist in these efforts. A shared commitment to standardize recruiting and hiring efforts would simplify the application process for out-of-state applicants, and could strengthen the application pool for individual positions. Further, working cooperatively with colleges and universities will enable these institutions to develop programs that address agency needs.

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